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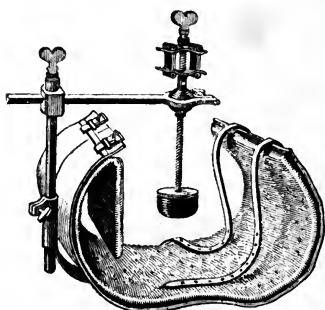
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RECENT IMPROVEMENTS BY ELASTIC PRESSURE.

BY

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PRISON, AND LECTURER ON MILITARY SURGERY IN DUBLIN.

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BY

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P R E F A C E

TO THE THIRD EDITION.

IN preparing the present edition of this work for the press, the author has anxiously endeavoured to carry out still more fully the views which originally induced him to publish it. His ambition having been to furnish both the student and the practitioner with a succinct account of the various medicines used in the treatment of disease, he has carefully avoided burthening its pages with theoretical or conjectural details of the mode in which remedies are supposed to produce their effects on the human body, or with any attempt at over-refinement in classification. The present state of medical science forbids perfection in any of its branches, and probably least of all in therapeutics, the author has therefore been more desirous that his book should be practically useful than theoretically scientific; and it is to his having kept this principle before him that he ascribes its success hitherto.

The arrangement adopted in the former editions has been strictly adhered to, but the size of the volume is much augmented, the

additions having been chiefly made in the account of the therapeutical effects of individual medicines; the introductory remarks to each chapter having also been somewhat enlarged: but it must be remembered that these remarks are necessarily concise, and are to be regarded as mere outline sketches; the author intending them to be simply *introductory*, and not to supply a knowledge of general therapeutics.

A table of weights and measures, according to the several British, Irish, and French systems is appended to this edition, for the preparation of which the author is indebted to his friend Dr. William K. Sullivan, Chemist to the Museum of Irish Industry.

17, MERRION SQUARE, EAST, DUBLIN.

January 1st, 1851.

TABLE

OF

BRITISH, IRISH, AND FRENCH WEIGHTS AND MEASURES.

The Dublin College, in the last edition of their Pharmacopœia just published, has substituted for the old apothecaries' weight, which has as a basis the Troy pound of 12 ounces or 5760 grains *Troy*, the avoirdupois weight having a pound of 16 ounces or 7,680 grains *avoirdupois*. In the subdivisions of the pound however, the equivalent values of the pounds, ounces, drachms, and scruples are given in *Troy grains*. It will therefore be useful to present a table of the corresponding values in avoirdupois grains, and in French weights of the decimal system.

Irish Apothecaries' Weight, Dub. Ph. 1850.

1 pound avoirdupois	=	16 ounces	=	7000 grains Troy	=	7680 grains avoirdupois	=	[453.544 French grammes, or 453½ nearly.	
1 ounce	„	=	8 drachms	=	437.5 grains Troy	=	480 grains avoirdupois	=	[28.346 French grammes, or 28½ nearly.
1 drachm	„	=	3 scruples	=	54.68 grains Troy	=	60 grains avoirdupois	=	[3.542 French grammes, or 3½ nearly.
1 scruple	„	=		=	18.22 grains Troy	=	20 grains avoirdupois	=	[1.180 French grammes, or 1¼ nearly.

English and Scotch Apothecaries' Weight.

This system is essentially the same as the Troy weight, but differently divided.

1 grain	=	1.097 grains avoirdupois	=	0.0648 grammes.
20 grains	=	1 scruple	=	21.94 grains avoirdupois = 1.296 grammes, or a little more than 1¼.
3 scruples	=	1 drachm	=	65.82 grains avoirdupois = 3.888 grammes, or 3¾ nearly.
8 drachms	=	1 ounce	=	526.628 grs. avoirdupois = 31.102 grammes, or 31⅙.
12 ounces	=	1 pound	=	13 ounces 2 drachms 1 scruple 9¼ grains = 373.233 grammes, [or a little more than 373½.

The divisions of the Troy and Avoirdupois pound, with their corresponding values in French weights of the decimal system, are next appended.

Imperial Troy Weight.

1 grain = 0.0648 French grammes or 64.8 milligrammes.

24 grains = 1 pennyweight = 1.5552 grammes.

20 dwts. = 1 ounce = 31.1027 grammes.

12 ozs. = 1 lb. = 373.233 grammes.

Imperial Avoirdupois Weight.

10 grains = 1 scruple = 0.590 grammes.

3 scruples = 1 drachm = 1.771 „

16 drachms = 1 ounce = 28.346 „

16 ounces = 1 pound = 453.544 „

28 pounds = 1 quarter = 12.699 kilogrammes.

4 quarters = 1 cwt. = 50.796 „

20 cwt. = 1 ton. = 1015.92 „

Measures.

The Measures are now assimilated in the three British Pharmacopœias ; their correspondence with the French system of Measures is given in the following table :—

1 gallon = 8 pints = 10 lbs. of water = 277-274 cubic inches = 4.54340 litres, or little more than 4½.

1 pint = 20 fluid ounces = 1½ lbs. of water = 34.659 cubic inches = 0.56792 litre, or [little more than half a litre.

1 fluid oz. = 8 fluid drachms = 1 oz. of water = 1.732 cubic inches = 0.02839 litre, or [28 millilitres.

1 fluid drachm = 3 fluid scruples = 1 drn. of water = 0.216 cubic inches, or ¼ nearly = [0.003549 litre.

1 fluid scruple = 20 minims = 20 grains avoirdupois = 0.001113 litres, or 1½ millilitres nearly.

1 minim = 0.05915 of a millilitre.

FRENCH WEIGHTS AND MEASURES.

In the French decimal system the unit of weight is 1 gramme, which is the weight of a *cubic centimetre*, or the 1000th part of a cubic metre of pure distilled water, at the temperature of 32° F. and barometer 30 inches ; it weighs 15.433 grains Troy, and 16.924 grains avoirdupois.

The litre is the unit of all measures of capacity ; it is a cubic decimetre = 61.028 cubic inches, or about 1¾ pints nearly. A litre weighs exactly 1000 grammes, or 1 kilogramme, at 32° Fabr. and 30 inch barometer.

Milligramme = 0.0154 Troy grain, about $\frac{1}{65}$ of a grain.

Centigramme = 0.1543 Troy grain, or about $\frac{1}{6}$ of a grain nearly.

Decigramme = 1.5434 Troy grain, or about 1½ grain.

GRAMME = 15.4340 Troy grains, or 15½ nearly.

Decagramme = 154.3402 Troy grains, or about 2 drachms, 2 scruples, and 9 grains Irish apothecaries' weight.

Hectogramme = 3.527 oz. avoirdupois, or about 3½ oz.

Kilogramme = 2 lbs. 3 oz. 4 drms. and about 19 gr. avoirdupois.

Myriagramme = 22.0485 lbs. avoirdupois, or 22 lbs. 0¾ oz. nearly.

Millier or Bar = 9 tons 16 cwt. 3 qrs. 12 lbs.

Measures.

Millilitre = 0.06103 cubic inches = 0.282 of a fluid drachm, or about 17 minims nearly.

Centilitre = 0.61028 = 2 fluid drachms, $2\frac{1}{2}$ fluid scruples.

Decilitre = 6.10280 = $3\frac{1}{2}$ fluid ounces.

LITRE = 61.02803, or a little more than $1\frac{3}{4}$ pints imperial.

Decalitre = 610.28028, or very nearly $2\frac{1}{2}$ imperial gallons.

Hectolitre = 3.5317 cubic feet, or 22 imperial gallons.

Kilolitre = 35.3171 cubic feet, or 220 imperial gallons very nearly.

Myrialitre = 353.1746 cubic feet.

In the decimal system the prefixes for multiplying are Greek, and for division are derived from Latin.

<i>Deca</i>	prefixed	means	10 times
<i>Hecto</i>	„	„	100 „
<i>Kilo</i>	„	„	1000 „
<i>Myria</i>	„	„	10,000 „

On the other hand, in dividing,

<i>Deci</i>	means the	10th part.
<i>Centi</i>	„	100th „
<i>Milli</i>	„	1000th „

There is a modification of the decimal system in use in France in commerce, which is employed also by manufacturers of chemical products, but which is not recognised by the law; every effort being made by the authorities to bring the decimal system into general employment, it is consequently falling into complete disuse; but as it is still occasionally employed, it is thought better to insert it here. The standards are the same as in the true metrical system, but the divisions are binary, that is, the standards are divided or multiplied by 2, 4, 8, &c. This modification is denominated the “*Système usuel*.”

Système usuel.

	<i>Grammes.</i>	<i>lbs. ozs. drms.</i>	
Kilogramme =	1000	= 2 3 $4\frac{1}{2}$	(about) ordinary avoirdupois.
<i>Livre usuel</i> =	500	= 1 1 $10\frac{1}{4}$	„ „ „
Half =	250	= 0 8 $13\frac{1}{2}$	
Quarter =	125	= 4 $6\frac{1}{2}$	
Eighth =	62.5	= 2 $3\frac{1}{4}$	
<i>Once</i> =	31.25	= 1 $1\frac{3}{8}$	
Half =	15.6	= 8 $\frac{3}{4}$	nearly.
Quarter =	7.8	= 4 $\frac{3}{8}$	
<i>Gros</i> =	3.9	= 2 $\frac{1}{2}$	about.

The French *gros* is therefore a little more than 2 drachms of the new apothecaries' weight.

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MEDICINES,

THEIR USES AND MODE OF ADMINISTRATION.

CHAPTER I.

ANTACIDS.

(Alkalines—Antilithics—Absorbents—Lithontriptics.)

ANTACIDS may be defined in general terms, to be medicines which correct acidity by combining chemically with any free acid that may exist in the stomach and digestive organs, and neutralizing it. Their action is manifestly only temporary and palliative, as they do not correct that peculiar state of the digestive organs which favours the formation of acid; their protracted use, indeed, produces a precisely similar tendency in the alimentary canal; and few individuals can bear the continued use of free or carbonated alkalies, a state of general anemia, usually attended with oxalic acid deposits in the urine and symptoms somewhat analogous to those of scurvy, being caused by it. Antacids should, therefore, be prescribed in combination with *vegetable tonics*; and in no case should their administration be long persisted in without occasional interruptions. Besides their merely chemical action, alkaline remedies aid the digestion and thereby promote the assimilation of fatty matters, thus resembling to a certain extent the action of the bile and pancreatic juice, they are consequently indicated when there is a deficiency of these secretions. When their use has been continued for some time, the fibrine of the blood becomes diminished in quantity, and with the view of producing this effect alkalies are sometimes employed in acute inflammations. One or two circumstances relating to the particular remedy of this class which ought to be employed, when they are administered with the intention of correcting acidity, may here be noticed:—Where the

acid exists in the stomach in the gaseous state, ammonia and its carbonate should be preferred, as, in consequence of their volatility, a gaseous acid, which would elude the action of the fixed alkalies, will be neutralized by them. If the acidity be present in the lower bowels, as in the cœcum or colon, magnesia or lime ought to be administered, as being less likely than the other antacids to be neutralized or absorbed before they reach that portion of the intestinal canal. Where the acid exists in the urinary organs, the alkalies will be found best adapted, as they have a tendency to act more directly on the kidneys; and where it is *lithic acid* that predominates in the urine, the preparations of potash should be preferred to those of soda, as the salt formed by the combination of the former with the acid in question is much more soluble than that formed with the latter.

AMMONIÆ LIQUOR, D. L. AMMONIÆ AQUA, E. *Aqueous solution of Ammonia.* (Syn. *Ammonia caustica aqua*, D.)

PREPARATION.—*Dublin.* Sal-ammoniac, in fine powder; fresh burned lime, of each eight ounces; water four ounces; distilled water, sixteen ounces: pour on the lime the four ounces of water, and, when the slaked lime has cooled, mix it well with the sal-ammoniac by trituration in a mortar. Introduce the mixture into a matrass of glass, or, if such can be had, an iron bottle, and, having closed this by means of a cork perforated by a suitable tube conveying off the gas, apply, with the intervention of sand, a gentle heat, which must be gradually augmented, and cause the ammonia, as it is evolved, to pass first through a small Wolfe's bottle furnished with a syphon safety-tube containing mercury; and thence to the bottom of a pint bottle containing the distilled water. The temperature of the latter must be prevented from rising as the absorption of the gas proceeds, by surrounding the bottle which contains it with cold water, which should be frequently renewed. *London.* "Hydrochlorate of ammonia, ℥x.; lime, ℥viij.; water, Oij.; put the lime slaked with water into a retort, then add the salt broken into small pieces, and the remainder of the water; let f℥xv. distil." *Edinburgh.* "Sal-ammoniac, ℥xiiij.; quicklime, ℥xiiij.; water, f℥viiss.; distilled water, f℥xij.; slake the lime with the water; cover it up till it cools; triturate it well and quickly, with the sal-ammoniac previously in fine powder; and put the mixture into a glass retort, to which is fitted a receiver with a safety tube. Connect with the receiver a bottle also provided with a safety tube, and containing f℥iv. of the distilled water, but capable of holding twice as much. Connect this bottle with another loosely corked, and containing the remaining f℥viij. of the distilled water. The communicating tubes must descend to the bottom of the bottles at the farther end from the retort; and the bottles and receiver must be kept cool by snow, ice, or a running stream of very cold water. Apply to the retort a gradually increasing heat till gas ceases to be evolved; remove the retort, cork up the aperture in the receiver where it was connected with the retort, and apply to the receiver a gentle and gradually-increasing heat, to drive over as much of the gas in the fluid contained in it, but as little of the water as possible. Should the liquid in the last bottle not have a density of 960, reduce it with some of the strong ammonia in the first bottle, or raise it with distilled water so as to form aqua ammoniac of the prescribed density. The strong aqua ammoniac in the first bottle may be reduced to form the weaker solution, by diluting it with two parts and a half of water."

PHYSICAL PROPERTIES.—A colourless limpid liquid, with a pungent ammoniacal odour, and a very acrid alkaline taste. The specific

gravity varies with the strength of the preparation; that of Dublin is directed to be .950, that of London and Edinburgh .960.

CHEMICAL PROPERTIES.—A solution of gaseous ammonia in water; Ammonia is composed of $N. H^3$.; or of 1 equivalent of *amidogene*, and 1 of hydrogen, (Kane.) At $32^{\circ} F$. water may be made to absorb 780 times its volume of the gas; according to the table of Sir H. Davy, the solution of the Dublin Pharmacopœia contains about 12.75 per cent, that of London and Edinburgh about 10 per cent of ammonia. It neutralizes acids with which it forms salts; gives a brown colour, which is only temporary, to litmus paper, and forms dense white fumes with the vapour of muriatic acid. Exposed to the air, part of the gas escapes rapidly in consequence of its volatility, while the remainder, absorbing carbonic acid, is converted into carbonate of ammonia, which remains in solution. Cooled down to -40° a strong solution freezes into long silky needles, and at 50° it boils; the weak solution of the pharmacopœias boils at about 150° .

Adulterations.—Solution of ammonia often contains carbonate of ammonia, which is known by its effervescing with acids, or by lime water causing a white precipitate in it; and hydrochlorate of ammonia, which is detected by solution of nitrate of silver causing a white precipitate with it, nitric acid having been previously added to saturation. The presence of sulphuric acid in it may be recognized by the addition of a solution of chloride of barium; and that of lime by oxalate of ammonia. That it is of the proper strength is indicated by its being of the prescribed density. Dr. Douglas Maclagan has recently pointed out an adulteration of commercial water of ammonia with *pyrrol*, which, he supposes, occurs from its being distilled directly from the refuse water of the gas-house. The presence of this principle renders it completely unfit for use in either medicine or pharmacy. It is readily detected by adding pure nitric acid, which produces a red colour, afterwards becoming purple in water of ammonia, if any *pyrrol* be present. The following are the tests for its purity proposed by the London and Edinburgh Colleges:—*London*. “By heat it totally evaporates in evanescent alkaline vapours as shown by turmeric. It gives no precipitate with lime water. When saturated with nitric acid, neither sesquicarbonate of ammonia nor nitrate of silver throws down anything.” *Edinburgh*. “Diluted nitric acid occasions no effervescence: when saturated with nitric acid it is not precipitated by solution of nitrate of silver.”

THERAPEUTICAL EFFECTS.—Ammonia acts directly by its neutralizing powers; it also stimulates powerfully the digestive organs. It is, therefore, to be preferred to the other remedies of this class, in cases where we wish to combine the effects of a stimulant and antacid, as in cardialgia and flatulence arising from acidity of the stomach; but if there be any tendency to inflammation present, it should not be employed. As an antidote in poisoning with the mineral acids, it is not so valuable as the other alkalies; but in cases of poisoning with prussic acid, oil of bitter almonds, &c. it is only inferior to chlorine. (See, *Caustics*, *Epispastics* and *General Stimulants*.)

DOSE AND MODE OF ADMINISTRATION.—Min. x. to min. xxx. diluted with an ounce of water, syrup, or any bland fluid.

INCOMPATIBLES.—All acids; and the earthy and metallic salts, except those of potash, soda, lime, and baryta.

In poisoning with ammonia the best antidotes are the vegetable acids.

AMMONIÆ BICARBONAS, D. *Bicarbonate of Ammonia.*

PREPARATION.—“Take of commercial sesquicarbonate of ammonia, any convenient quantity: Reduce it to a fine powder, and having spread it on a sheet of paper, expose it to the air for twenty-four hours. Let it be now enclosed in a well stopped bottle.”

PHYSICAL PROPERTIES.—This salt, when prepared by crystallization, may be obtained in large crystals of the right rhombic prism series; it has a weak ammoniacal odour, and a saline taste.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of ammonia, 2 of carbonic acid, and 2 of water; or of 1 equivalent of *amidogene*, 1 of hydrogen, 2 of carbonic acid, and 2 of water, (Kane.) It is permanent in the air; exposed to a strong heat it evaporates, leaving no residue if pure; it is soluble in eight parts of water at 60°; boiling water decomposes it, driving off part of its carbonic acid and ammonia. The solution in cold water is faintly alkaline.

THERAPEUTICAL EFFECTS.—This preparation, though not much used, is an excellent antacid, and has been retained in the new edition of the Dublin Pharmacopœia; it possesses in a less degree the stimulating properties of ammonia or of the sesquicarbonate, and is more agreeable to the taste.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to. gr. xxv. It may be given in *cold* aqueous vehicles, or in any of the bitter vegetable infusions.

INCOMPATIBLES.—Same as for aqua ammoniæ.

AMMONIÆ SESQUICARBONAS, D. L. AMMONIÆ CARBONAS, E. *Sesquicarbonate of Ammonia; Carbonate of Ammonia.*

An article of the Materia Medica in the Dublin Pharmacopœia. *London. Edinburgh.* “Hydrochlorate of ammonia (sal ammoniac, E.), lbj.; chalk, lbjss.; reduce them separately to fine powder; mix, and (in a retort with a proper receiver, E.) sublime with a gradually-increasing heat.”

PHYSICAL PROPERTIES.—A solid white salt, in semi-transparent fibrous cakes or fragments; with a pungent ammoniacal odour, and a caustic alkaline taste. Specific gravity .966.

CHEMICAL PROPERTIES.—It consists of 3 equivalents of carbonic acid, 2 of ammonia, and 2 of water; or of 1 equivalent of the bicarbonate, and 1 of a simple carbonate which consists of 1 of *amidogene*, 1 of hydrogen, and 1 of carbonic acid, (Kane.) Exposed to the air it effloresces and soon falls to powder, neutral carbonate of ammonia being evolved; the remaining powder is the bicarbonate: this change has been taken advantage of in the simple process of the Dublin

College for obtaining that preparation. It is sublimed by heat, without any residuum if it be pure. It is soluble in four parts of water at 60°, but is decomposed by boiling water and by alcohol: the solution is highly alkaline; turmeric paper, which has been rendered brown by it, recovers its yellow colour on exposure to the air.

Adulterations.—If this salt contains any fixed or insoluble impurity, it will not be entirely sublimed by heat nor completely soluble in water. Sometimes owing to bad preparation, it contains muriate or sulphate of ammonia; their presence is detected, the former by nitrate of silver, the latter by hydrochlorate or nitrate of baryta, causing a white precipitate in a solution of the salt, nitric acid having been previously added to saturation. Lead is also sometimes present in it from the same cause; this may be at once detected by dissolving it in water, when the carbonate of lead falls down as an insoluble white precipitate. If it contains any empyreumatic oil, the solution in a dilute acid is dark coloured. Sesquicarbonate of ammonia is, however, generally met with of good quality at present. The London and Edinburgh Colleges propose the following tests for its purity:—*London*. “Translucent in mass, but falls to powder in the air; entirely vaporizable and soluble; changes the colour of turmeric; when saturated with nitric acid it does not precipitate with chloride of barium or nitrate of silver.” *Edinburgh*. “Heat sublimes it entirely; a solution in water with nitric acid in excess does not precipitate with solution of nitrate of baryta or nitrate of silver.”

THERAPEUTICAL EFFECTS.—As an antacid it may be employed in the same forms of dyspepsia as the solution of ammonia; but where flatulence is present, the use of the carbonate is objectionable, owing to the carbonic acid which is set free in the stomach; its stimulant properties also contraindicate its employment where there is any tendency to inflammation. Carbonate of ammonia is administered with much advantage in the lithic acid diathesis; and it has been used, it is stated, with much benefit in diabetes, but my own experience is not confirmatory of this statement. (See *Emetics and General Stimulants*.)

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xx. in pill, or in any cold aqueous vehicle. Gr. xxx. produces vomiting.—*Liquor Ammoniae sesquicarbonatis*, L. *Ammoniae carbonatis aqua*, E. (Dissolve ʒiv. of sesquicarbonate (carbonate, E.) of ammonia in Oj. of distilled water, and filter.) A convenient strength for medicinal purposes; Dose, min. xxx. to min. lx. properly diluted.

INCOMPATIBLES.—Acids; the fixed alkalies and their carbonates; bitartrate of potash; calcareous salts; and the salts of iron, zinc, lead, and mercury; but sulphate of magnesia is not incompatible with sesquicarbonate of ammonia.

CALCIS LIQUOR, D. L. *CALCIS AQUA*, E. *Lime Water*. (Syn. *Calcis aqua*, D.)

PREPARATION.—*Dublin*. “Take of fresh burned lime, two ounces; distilled water,

half a gallon ; having slaked the lime with an ounce and a-half of the water, introduce it into a well stopped bottle containing the remainder of the water, and shake well for the space of five minutes. After twelve hours the excess of lime will have subsided, and the clear lime-water may be drawn off with a syphon as it may be required. When the entire of the solution has been withdrawn, it may be renewed by shaking the sediment at the bottom of the bottle with another half gallon of water ; and, if the lime be pure, and the bottle be accurately stopped, this process may be successfully repeated three or four times." *London*. "Lime, lbss. ; distilled water, Oxiij. ; upon the lime first slaked with a little of the water pour the remainder of the water, and shake them together ; then immediately cover the vessel and set it by for three hours ; afterwards keep the solution with the remaining lime in stopped glass vessels ; and when it is to be used, take from the clear solution." *Edinburgh*. "Take any convenient quantity of water ; pour a little of it over about a twentieth of its weight of lime ; when the lime is slaked, add it to the rest of the water in a bottle ; agitate well ; allow the undissolved matter to subside ; pour off the clear liquor when it is wanted, replacing it with more water, and agitating briskly as before."

PHYSICAL PROPERTIES.—A transparent, colourless liquid ; odourless, but having a disagreeable, alkaline taste.

CHEMICAL PROPERTIES.—Lime is only sparingly soluble in water ; requiring 732 parts of cold and about 1500 parts of boiling water for its solution (Wittstein,) being therefore more soluble in cold than in hot water, so that a saturated solution, when boiled, deposits a hydrate of lime. Exposed to the air, lime water absorbs carbonic acid, and becomes covered with a thin crust of carbonate of lime, it must consequently be kept for medical use in well stoppered bottles. According to M. Chevreul, lime water, if kept in white glass bottles for any length of time, dissolves an appreciable portion of the oxide of lead which enters into their composition. It acts faintly alkaline on vegetable colours, gives white precipitates with carbonic and oxalic acids, but does not precipitate with sulphuric acid.

THERAPEUTICAL EFFECTS.—Lime water is a useful antacid in those forms of dyspepsia which are characterized by great irritability of the stomach, accompanied by constant secretion of acid. In the United States Dispensatory, a diet almost exclusively of lime water and new milk, in the proportion of one part of the former to two or three of the latter, is recommended as a very effectual plan of treatment in dyspepsia accompanied by vomiting of food, but in such cases I have found Carrara water (see page 8,) with milk much more efficacious. In the acidity of stomach of the gouty and rheumatic diathesis, the alkaline antacids are usually preferred to lime, but the use of lime water increases the urinary secretion and diminishes the tendency to the deposit of urates, indications of its therapeutical value in these diseases. Lime water may be given as an antidote in poisoning with nitric, muriatic or oxalic acids.

DOSE AND MODE OF ADMINISTRATION.—fʒi. to fʒiv. It is most conveniently administered in milk, which conceals its disagreeable taste ; but as this addition would be injurious in many cases, it may be given alone. When lime water has been administered for some time, its use should be occasionally discontinued.

INCOMPATIBLES.—The vegetable and mineral acids ; alkaline and

metallic salts; tartar emetic; and most vegetable infusions and decoctions, as those of calumba, cinchona bark, gentian, senna, rhubarb, sarsaparilla, &c.

CRETA PRÆPARATA, D. L. E. CALCIS CARBONAS PRÆCIPITATUM, D. *Prepared chalk. Precipitated carbonate of lime.*

PREPARATION.—*Creta præparata*, D. “Take of chalk one pound; water, a sufficient quantity; reduce the chalk to a fine powder, and having triturated this in a large mortar with as much water as will give it the consistence of cream, fill the mortar with water, and stir well, giving the whole a circular motion. Allow the mixture to stand for fifteen seconds, and then decant the milky liquid into a large vessel. Triturate what remains in the mortar, adding as much water as was previously used, and, after allowing it to settle for fifteen seconds, again decant, and let this process be repeated several times. Let the fine sediment which subsides from the decanted liquids, be transferred to a calico filter, and dried at a temperature not exceeding 212° .” L. E.—“Chalk, any quantity (Ibi. L.), add a little water to the chalk, and rub it to the powder; put it into a large vessel with a sufficiency of water, and mix with frequent agitation; let it rest for a short time, and pour off the supernatant liquor still turbid; (repeat the process, E.); finally; collect on a filter (of linen or calico, E.) the fine powder that has subsided from the poured off liquor, and dry it for use.” “Oyster shells, first freed from impurities, and washed with boiling water, are prepared in the same manner.” L. E.—*Calcis carbonas præcipitatum*, D.—“Take of chloride of calcium, five ounces; crystals of commercial carbonate of soda, thirteen ounces; boiling water, two quarts: dissolve each salt in a quart of the water, mix the two solutions, and when the precipitate has subsided, draw off the supernatant liquor. Transfer the sediment to a calico filter, and wash it with boiling hot distilled water, until the washing cease to give a precipitate with nitrate of silver. Finally, dry the product at a temperature not exceeding 212° .”

PHYSICAL PROPERTIES.—Prepared chalk is usually in small conical masses, of a dull greyish white colour, opaque, and very friable; the powder is soft and massive. It is odourless, and tasteless, but adherent to the tongue. Specific gravity about 2.3. Precipitated carbonate of lime is a snow-white, fine powder.

CHEMICAL PROPERTIES.—It is composed of one equivalent of carbonic acid, and one of lime. It is permanent in the air; exposed to a red heat it parts with its carbonic acid, and is converted into quicklime. It is miscible with, but is scarcely soluble in water, one part requiring about 1600 parts of water for its solution; it dissolves in large quantity in water containing carbonic acid, from which, however, it is deposited on exposure to the air.

Adulterations.—Prepared chalk generally contains silica and alumina, and, from not having been sufficiently dried, moisture; these impurities are best detected by the tests of the *Edinburgh Pharmacopœia*, which indicate the exact amount of pure carbonate of lime present:—“A solution of gr. xxv. in f3x. of pyroligneous acid, when neutralized by carbonate of soda, and precipitated by gr. xxxij. of oxalate of ammonia, continues precipitable after filtration by more of the test.” Finely ground sulphate of lime is sometimes substituted for precipitated chalk; the fraud may be readily detected by its insolubility in dilute muriatic acid.

THERAPEUTICAL EFFECTS.—Chalk is employed with much benefit as an antacid, in acidity of the digestive organs, especially when accompanied by diarrhoea, as is so frequently the case in infancy and childhood; for this purpose it is advantageously combined with aromatics, or with opium. It is used as a desiccant in bed-sores, intertrigo, erysipelas, &c. Chalk is an excellent antidote in poisoning with nitric, muriatic, or oxalic acids. Precipitated carbonate of lime is not much employed in medicine, as it possesses but little advantage over prepared chalk, and is much more expensive; its chief use is as an ingredient in tooth powders. Carbonate of lime dissolved in water by means of carbonic acid in excess constitutes an aerated solution of the bicarbonate, and is sold by venders of mineral waters under the name of *Carrara water*. It is a most useful and agreeable form for its administration, and when given mixed with an equal quantity of milk is productive of excellent effects in many forms of chronic dyspepsia, especially in those characterised by excessive secretion of air in the stomach, by regurgitation of food, and by vomiting; the quantity of bicarbonate of lime however held in solution is so small that its action as an antacid is but trifling. All preparations of lime are contraindicated in cases in which there is a tendency to phosphatic deposits in the urine.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒij. in powder or in mixture. The dose of *Carrara water* is from fʒij. to fʒiv. three times a day.—*Mistura Cretæ*, D. L. E. (“Prepared chalk, ʒij.; simple syrup; mucilage of gum-arabic, of each, fʒss.; cinnamon water, fʒvij.; rub the chalk with the cinnamon water, then add the syrup and mucilage, and mix;” D.—“Prepared chalk, ʒss.; sugar, ʒiij.; mixture of acacia, fʒiss.; cinnamon water, fʒxviij.; mix;” L.—“Prepared chalk, ʒx.; pure sugar, ʒv.; mucilage, fʒiij.; spirit of cinnamon, fʒij.; water, Oij.; triturate the chalk, sugar, and mucilage together; and then add gradually the water and spirit of cinnamon;” E.) Chiefly used in diarrhoea for its antacid properties and as a vehicle for more active medicines. Dose, fʒi. to fʒij.—*Pulvis Cretæ compositus*, D. L. E. (“Prepared chalk, ʒv.; cinnamon, ʒijss.; gum-arabic, ʒij.; nutmeg, ʒss.; rub the ingredients separately to powder, then mix and pass through a fine sieve, D. “Prepared chalk, ʒss.; cinnamon, ʒiv.; tormentil root, and gum-arabic, of each, ʒiij.; long pepper, ʒss.; rub them separately to fine powder, and then mix them.” L. “Prepared chalk, ʒiv.; cinnamon, in fine powder, ʒjss.; nutmeg, in fine powder, ʒj.; triturate them well together,” E.) Antacid and aromatic, principally employed in the diseases of children. Dose, gr. x. to gr. xxx.—*Trochiscus Cretæ*, E.—(Prepared chalk, ʒiv.; gum arabic, ʒj.; nutmeg, ʒj.; pure sugar, ʒvj.; reduce them to powder, and beat them with a little water into a proper mass for making lozenges.) Antacid and aromatic, used in acidity of the stomach; Dose, ʒj. to ʒij.

INCOMPATIBLES.—Acids, and acidulous salts.

MAGNESIA, D. L. E. *Magnesia ; Calcined Magnesia.*

PREPARATION.—*Dublin*—“Carbonate of magnesia, any convenient quantity : introduce it into a clay crucible, closed loosely by a lid, and let this be exposed to a low red heat as long as a little of the magnesia, taken from the central part of the crucible, when cooled and dropped into dilute sulphuric acid, continues to give rise to effervescence. Let the product be preserved in well-closed bottles.” *London*—“Carbonate of magnesia, $\mathfrak{z}\text{iv}$. burn it for two hours in a very strong fire.” *Edinburgh*—“Expose any convenient quantity of carbonate of magnesia in a crucible to a full red heat, for two hours, or till the powder, when suspended in water, presents no effervescence on the addition of muriatic acid ; preserve the product in well-closed bottles.”

PHYSICAL PROPERTIES.—A very light, soft powder, perfectly white, odourless and tasteless, slightly adherent to the tongue. Specific gravity about 2·3.

CHEMICAL PROPERTIES.—It consists of one equivalent of magnesium, and one of oxygen. Exposed to the air it absorbs carbonic acid and moisture ; it is highly infusible. It is very slightly soluble in water, requiring 5142 times its weight of water at 60° for its solution ; and, like lime, it is more soluble in cold than in hot water. It acts feebly alkaline on vegetable colours.

Adulterations.—Magnesia generally contains some carbonate, either from faulty preparation or bad keeping ; its presence is indicated by effervescence being caused on the addition of any dilute mineral acid. It is frequently adulterated with lime, silica, and alumina. If it contain silica, it will not dissolve completely in dilute hydrochloric acid ; if alumina be present, the solution in the dilute acid precipitates with excess of ammonia ; and if lime be present, solution of oxalate of ammonia, or of the bicarbonate of potash, gives a white precipitate with the solution in the dilute acid. Sulphate of magnesia is sometimes present in it ; this is detected by solution of chloride of barium giving a white precipitate with the solution in hydrochloric acid.

THERAPEUTICAL EFFECTS.—As an antacid magnesia is employed in dyspepsia, attended with acidity of the stomach and constipation ; in such cases it is generally preferred to the alkalies, as being less irritant, and as the combinations which it forms with the free acids of the stomach are gently laxative. In gastrodynia and heartburn, given in combination with some aromatic, a short time before the meals, it seldom fails to prove beneficial. It is also administered with much advantage in the acidity attendant on infantile diseases ; in persons of a gouty and rheumatic diathesis, as it diminishes the quantity of uric acid in the urine ; and in lithiasis. Magnesia is also used as an antidote in poisoning with the mineral acids, but its employment in such cases is objectionable, for during its combination with the acids, a degree of heat sufficient to destroy the mucous membrane of the stomach is produced. (See also *Cathartics*).

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xxx. twice or three times daily. It may be given suspended in milk, or in some aromatic water.

INCOMPATIBLES.—Acids ; acidulous salts ; metallic salts ; and muriate of ammonia.

MAGNESIÆ CARBONAS, D. L. E. MAGNESIÆ CARBONAS PONDEROSUM, D. *Carbonate of Magnesia. Heavy Carbonate of Magnesia.*

PREPARATION.—*Dublin*.—"Sulphate of magnesia of commerce, ten ounces; crystallized carbonate of soda of commerce, twelve ounces; distilled water, a sufficient quantity: dissolve each salt in two quarts of water, mix the two solutions cold, and boil the mixture for ten minutes. Transfer the precipitate to a calico filter, and pour upon it, repeatedly, boiling water, until the washings cease to give a precipitate with a solution of nitrate of barytes. Lastly, dry by a heat not exceeding 212° ." *London, Edinburgh*.—"Take of sulphate of magnesia, ℥iv.; carbonate of soda, ℥vij. $\frac{3}{4}$; distilled water, cong. iv.; dissolve the salts separately, each in half the water, (and strain, L.); then mix and boil the liquors, stirring constantly with a spatula for fifteen (or twenty, E.) minutes. Lastly, the liquor being poured off, wash the precipitate (collected on a filter of linen or calico, E.) with boiling distilled water, and dry it." *Magnesiæ carbonas ponderosum, D.* "Sulphate of magnesia of commerce, ten ounces; crystallized carbonate of soda of commerce, twelve ounces; boiling distilled water, a sufficient quantity: dissolve the sulphate of magnesia in half a pint, and the carbonate of soda in a pint of the water, mix the two solutions, and evaporate the whole to dryness by means of a sand heat. Digest the residue for half an hour with one quart of boiling distilled water, and having collected the insoluble matter on a calico filter, treat it repeatedly with warm distilled water, until the washings cease to give a precipitate when suffered to drop into a solution of nitrate of barytes. Finally, dry the product at a heat not exceeding 212° ."

PHYSICAL PROPERTIES.—A very white powder, light and bulky; inodourless and tasteless, varying in density, two sorts being commonly met with; the one very light, and either in very fine powder or in small cubical cakes (*light magnesia*;) the other dense, and somewhat granular (*heavy magnesia*.) Both are officinal in the Dublin Pharmacopœia.

CHEMICAL PROPERTIES.—According to Berzelius, it is a compound of hydrate of magnesia with hydrated carbonate of magnesia, consisting of 3 equivalents of carbonic acid, 4 equivalents of magnesia, and 4 equivalents of water. It is permanent in the air; exposed to a strong red heat it parts with its water and carbonic acid, magnesia being left. It is very sparingly soluble in water, requiring 2493 parts of cold, and 9000 of hot water for its solution. But water charged with carbonic acid gas dissolves it, in the proportion of about 20 grains to the ounce. It acts, on vegetable colours, feebly alkaline.

Adulterations.—They are similar to those of calcined magnesia, and may be detected by the same tests.

THERAPEUTICAL EFFECTS.—Carbonate of magnesia is employed as an antacid in the same cases as magnesia; but owing to the carbonic acid which is disengaged in the stomach when it meets with the acids naturally present in that viscus, its use is objectionable in many cases. (See also *Cathartics*).

DOSE AND MODE OF ADMINISTRATION.—Gr. xv. to 3ss., it may be administered suspended in milk, or in some aromatic water. The most convenient form, however, for the exhibition of the carbonate of magnesia, is the solution in carbonated water, which was first introduced to the notice of the profession by Sir James Murray of

this city. It is prepared by exposing distilled water, in which very pure carbonate of magnesia is suspended (in the proportion of from 13 to 20 grains of the latter to every fluid ounce of the former) to a stream of carbonic acid gas forced into it by means of steam power, until a complete solution is formed. It then constitutes *Aqua Magnesiæ bicarbonatis*, and is given as an antacid in doses of fʒss. to fʒiiss. This preparation, as prepared by different makers, is very liable to vary in strength, and in some instances, a solution of sulphate of soda is substituted for it. By the following simple method, proposed by Mr. Redwood of London, the precise quantity of carbonate of magnesia contained in it may be readily ascertained:—Evaporate a fluid ounce of the solution to dryness in a wedgewood dish; calcine the residue at a red heat for about five or ten minutes, in a small Berlin crucible; then weigh the calcined residue. If this residue be pure calcined magnesia, every five grains of it will be equivalent to twelve grains of the hydrated carbonate of magnesia of commerce; after weighing the calcined residue, treat it with distilled water, when, if there be any soluble salts present, they will be dissolved out and may be tested, weighed, and the amount deducted from the weight of the magnesia.—*Trochisci Magnesiæ*, E. (Carbonate of magnesia, ʒvj.; pure sugar, ʒiij.; nutmeg, ʒj.; beat them in powder, with mucilage of tragacanth, to a mass for lozenges.) In acidity of the stomach, *ad libitum*.

INCOMPATIBLES.—Acids; acidulous, and metallic salts; muriate of ammonia; and lime water.

POTASSÆ CAUSTICÆ LIQUOR, D. LIQUOR POTASSÆ, L. POTASSÆ AQUA, E. *Water of caustic potash; Solution of potash.* (Syn. *Potassæ aqua causticæ*, D.)

PREPARATION.—*Dublin*.—"Pure carbonate of potash, one pound; fresh-burned lime, ten ounces; distilled water, one gallon and seven ounces: slake the lime with seven ounces of the water. Dissolve the carbonate of potash in the remainder of the water, and having raised the solution to the boiling point, in a clean iron vessel, gradually mix with it the slaked lime, and continue the ebullition for ten minutes, with constant stirring. Remove the vessel now from the fire, and when, by the subsidence of the insoluble matters, the supernatant liquor has become perfectly clear, transfer it by means of a syphon to a green-glass bottle, furnished with an air-tight stopper." *London*.—"Carbonate of potash, ʒxv.; lime, ʒviiij.; boiling distilled water, cong. j.; dissolve the carbonate of potash in half a gallon of the water; sprinkle a little of the water upon the lime, in an earthen vessel, and the lime being slaked, add the rest of the water. The liquors being immediately mixed together in a close vessel, shake them frequently until they are cold; then set aside, that the carbonate of lime may subside. Lastly, keep the supernatant liquor, when poured off, in a well-stopped green-glass bottle." *Edinburgh*.—"Carbonate of potash (dry), ʒiv.; lime, recently burned, ʒij.; water, fʒxlvi.; let the lime be slaked, and converted into milk of lime with fʒviiij. of the water; dissolve the carbonate in the rest of the water; boil the solution, and add the milk of lime in successive portions, about an eighth at a time—boiling briskly for a few minutes after each addition. Pour the whole into a deep, narrow glass vessel for 24 hours, and then withdraw with a syphon the clear liquid, which ought to amount to at least fʒxxx. and should have a density of 1.072." As solution of potash corrodes flint glass, it is directed in the pharmacopœias to be kept in green-glass bottles.

PHYSICAL PROPERTIES.—A transparent colourless liquid, with an oily appearance, and a soapy feel; it is odourless, but has an intensely acid alkaline taste. Its specific gravity is different in the three British Pharmacopœias; that of the *Dublin* preparation is 1.068, that of the *London*, 1.063, and that of *Edinburgh*, 1.072.

CHEMICAL PROPERTIES.—A solution of potassa in water. Exposed to the air it absorbs carbonic acid rapidly, and is converted into a solution of the carbonate of potash. By heat the water is driven off, but no further change takes place. It re-acts on vegetable colours powerfully alkaline. Solution of potash converts most oils and fats into soap. It does not effervesce with acids, but combines with them, forming salts.

Adulterations.—Solution of potash as kept in the shops is frequently too weak; this is known by its not being of the density prescribed by the colleges. If it contain any carbonate, it will effervesce on the addition of a dilute acid, and give a white precipitate with lime water. A white precipitate, caused by carbonate of soda, in the solution neutralized with dilute nitric acid, indicates the presence of lime.

THERAPEUTICAL EFFECTS.—In dyspepsia attended with acid eructations, cardialgia, and gastrodynia, solution of potash is employed with much benefit, and especially in those derangements of the digestive organs consequent on excessive indulgence in spirituous liquors. It not only neutralizes the free acid, but also counteracts the morbid tendency of the stomach to acid secretion; it must, however, be remembered that its action is only temporary, and that its continuous use deranges digestion and produces a tendency to acid secretion. Its beneficial action is especially manifested in various forms of chronic cutaneous disease so often dependant on acidity of the digestive organs; in which cases it should be preferred to the other remedies of this class. In the acidity of the stomach of the gouty and rheumatic, and in deposits of lithic acid or the lithates in the urine, solution of potash is also administered with much advantage. And in scrofulous affections of the testis and in many forms of external tubercular disease, the internal use of this remedy is in general productive of the best effects.

DOSE AND MODE OF ADMINISTRATION.—Min. x. gradually increased to min. xl.; it should be largely diluted. Fresh table beer, or veal broth, partly conceals its nauseous taste, and consequently either is employed as a vehicle for its administration. The combination with some aromatic bitter, as gentian, cascarilla, or calumba, is generally found very beneficial.—*Brandish's alkaline solution*; (Best American pearlshes, ℥ij.; quicklime, recently burned; and wood ashes (from the ash), of each, ℥ij.; boiling water, cong. vj.; add first the lime, then the pearl ashes, and afterwards the wood ashes to the boiling water; mix, and in 24 hours draw off the clear liquor; to every pint of which, add of oil of juniper, min. ij.) This solution has a less disagreeable taste than the officinal *liquor potassæ*, and is therefore more generally employed;

it is, however, very liable to vary in strength. Dose, f3ss. to f3ij.

INCOMPATIBLES.—Acids; acidulous and metallic salts; and the preparations of ammonia.

In cases of poisoning with solution of potash, the best antidotes are vinegar, lemon juice, and the fixed oils.

POTASSÆ BICARBONAS, D. L. E. *Bicarbonate of Potash.*

PREPARATION.—*Dublin.*—"Carbonate of potash from pearlash, one pound; distilled water, one quart; muriatic acid of commerce, one pint and a-half; water, three pints; chalk in small fragments, one pound, or a sufficient quantity: dilute the muriatic acid with the water, and having dissolved the carbonate of potash in the distilled water, filter the solution into a three-pint bottle capable of being tightly closed by a cork, traversed by a glass tube sufficiently long to pass to the bottom of the solution. A second bottle, in the bottom of which a few holes are drilled, and the mouth of which admits of being closed by a cork, also traversed by a glass tube, having been filled with the chalk, and placed in a glass or porcelain jar of the same height with itself, but of somewhat larger diameter, the exterior ends of the two tubes are to be connected air-tight by a tube of vulcanized Indian rubber. The cork of the bottle containing the carbonate of potash, being placed loosely, and that of the other bottle tightly, in its place, and the muriatic acid having been poured into the jar in which is lodged the perforated bottle containing the chalk, the liberation of carbonic acid commences, and as soon as it is judged that a sufficient amount of it has been developed, to expel completely the air from the apparatus, the cork of the carbonate of potash bottle is to be forced into it quite tight, and the process is to be abandoned to itself for a week. At the end of this time numerous crystals of the bicarbonate of potash will have formed, which are to be removed, shaken in a capsule with twice their bulk of cold water, which is to be rapidly decanted, next drained, and finally dried on bibulous paper by mere exposure to the atmosphere. The mother liquor, if filtered, and concentrated to one-half, at a temperature not exceeding 110°, will yield additional crystals. The tube immersed in the solution of carbonate of potash will have to be occasionally cleared of the crystals with which it is liable to become plugged, else the process will be suspended." *London.*—"Carbonate of potash, lbvj.; distilled water, cong. j.; dissolve the carbonate of potash in the water; afterwards pass carbonic acid through the solution to saturation; apply a gentle heat, so that whatever crystals are formed may be again dissolved. Then set aside, that crystals may be again produced; and the liquor being poured off, dry them. Carbonic acid is obtained from chalk rubbed to powder, and mixed with water to the consistence of a syrup, upon which sulphuric acid diluted with an equal weight of water is then poured." *Edinburgh.*—"Carbonate of potash, 3vj.; carbonate of ammonia, 3iiss.; triturate the carbonate of ammonia to fine powder; mix with it the carbonate of potash; triturate them thoroughly together, adding by degrees a very little water, till a smooth and uniform pulp be formed. Dry this gradually at a temperature not exceeding 140°, triturating occasionally towards the close; and continue the desiccation, till a fine powder be obtained, entirely free of ammoniacal odour."

PHYSICAL PROPERTIES.—Transparent, colourless crystals, the primary form of which is a right oblique-angled prism. It is inodorous, but has a mildly alkaline taste, without any acidity.

CHEMICAL PROPERTIES.—It is composed of one equivalent of potassa, two of carbonic acid, and one of water. It is permanent in the air; exposed to a moderate heat, part of the carbonic acid is driven off, and it is reduced to the state of carbonate. It is soluble in four parts of water at 60°, and in less than its own weight

of boiling water, by which, however, a portion of its acid is driven off; the solution is feebly alkaline. It is insoluble in alcohol.

Adulterations.—Bicarbonate of potash frequently contains carbonate of potash, from not having been sufficiently saturated with carbonic acid gas during the preparation; this is best detected by the action of solution of corrosive sublimate on a solution in 40 parts of water; if the salt contain even a trace of the carbonate, a brick-red precipitate will be produced. If any sulphates or chlorides be present, a solution supersaturated with nitric acid is precipitated white, with solution of hydrochlorate or nitrate of baryta if the impurity be a sulphate, and with solution of nitrate of silver if the impurity be a chloride.

THERAPEUTICAL EFFECTS.—Bicarbonate of potash may be administered as an antacid in the same cases as solution of caustic potash, its operation being similar; it is less irritating than and not so powerful as that preparation, but it acts more decidedly on the kidneys, increasing the secretion of urine, especially when taken in the form of the effervescing solution. It possesses the advantage, also, of being less unpleasant to the taste; and its employment may be continued without interruption for a longer period.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xx., two or three times a day; it may be given dissolved in some aromatic water.—*Liquor Potassæ effervescens*, L. *Potassæ aqua effervescens*, E. *Kali water*. (Bicarbonate of potash, ʒi.; distilled water, Oj.; dissolve the salt in the water, and pass into it carbonic acid under strong pressure, “more than sufficient for saturation; and keep the solution in a well-stopped vessel,” L.) An excellent and agreeable form for the administration of this salt; Dose, ʒiij. to ʒviij. three times a day.

INCOMPATIBLES.—Acids; acetate and muriate of ammonia; lime water; and most of the metallic salts, but not sulphate of magnesia.

POTASSÆ CARBONAS IMPURA, L. LIXIVUS CINIS, D. *Impure carbonate of potash; Pearlashes; Potashes.*

POTASSÆ CARBONAS E LIXIVO CINERE, D. POTASSÆ CARBONAS, L. E. *Carbonate of potash, prepared from potashes.*

POTASSÆ CARBONAS PURUM, D. E. *Pure carbonate of potash. Carbonate of potash prepared from crystals of tartar.* (Syn. *Potassæ carbonas e tartari crystallis*, D.)

Pearlashes or potashes are procured by lixiviation from the ashes of many trees and land plants. They are imported in large deliquescent masses of a dirty bluish white colour, packed in barrels; and are principally brought from America, where they are prepared in very large quantity from the trees cut down in the clearing of land: purified by any of the processes mentioned below, they are converted into pure carbonate of potash.

PREPARATION.—CARBONATE OF POTASH FROM POTASHES.—*Dublin.*—“Pearlash, ten pounds; distilled water, one gallon: pour the water on the pearlash, and macerate

for a week, occasionally stirring the mixture. Filter through calico, and having evaporated the solution nearly to dryness, reduce the heat, and stir constantly with an iron rod, until granular crystals are obtained. Let these be immediately enclosed in well-stopped bottles." *London*.—"Impure carbonate of potash, lbij. ; distilled water, Oiss. ; dissolve the impure carbonate of potash in the water, and strain ; then pour it off into a proper vessel, and evaporate the water, that the liquor may thicken ; then stir constantly with a spatula till the salt concretes. Carbonate of potash may be procured more pure from the crystals of bicarbonate of potash heated to redness."

Edinburgh.—"Obtained from the potashes of commerce by lixiviating, evaporating, and granulating, by fusion and refrigeration."—PURE CARBONATE OF POTASH.—

Dublin.—"White bitartrate of potash, two pounds ; sesquicarbonate of ammonia, half an ounce ; distilled water, three pints : place the bitartrate of potash in an iron pot or crucible, and, constantly stirring it with an iron rod, expose it to a red heat until vapours cease to be evolved. Reduce the residuum to a coarse powder, and, having boiled it for twenty minutes with one quart of the water, filter through paper, washing the filter and its contents with the residual pint of water, in which the sesquicarbonate of ammonia has been first dissolved. The filtered solution is now to be evaporated to dryness, and, a low red heat being finally applied, the product is to be rapidly reduced to powder in a warm mortar, and enclosed in well-stopped bottles."

Edinburgh.—"Most readily obtained by heating crystallized bicarbonate of potash to redness in a crucible ; but more cheaply by dissolving bitartrate of potash in 30 parts of boiling water, separating and washing the crystals, which form on cooling, heating these in a loosely-covered crucible to redness, so long as fumes are discharged, breaking down the mass and roasting it in an open crucible for two hours, with occasional stirring, lixiviating the product with distilled water, filtering the solution thus obtained, evaporating the solution to dryness, granulating the salt towards the close by brisk agitation, and heating the granular salt nearly to redness. The product of either process must be kept in well-closed vessels."

PHYSICAL PROPERTIES.—Carbonate of potash is met with in the form of coarse, white, crystalline grains, inodorous, with an acrid alkaline taste. When crystallized, which it is difficult to effect, the crystals are rhombic octohedrons.

CHEMICAL PROPERTIES.—It is composed of one equivalent of potassa, and one of carbonic acid, combined in the crystals with two equivalents of water. It attracts moisture, deliquescing rapidly and becoming liquid, but as it slowly absorbs carbonic acid from the air it again becomes dry gradually. By a red heat it is fused, but is not decomposed. It is soluble in less than its own weight of water at 60°, but is insoluble in alcohol. It is highly alkaline, but not caustic.

Adulterations.—As commonly met with in the shops, carbonate of potash contains much water ; the quantity present may be known by the loss of weight which the salt suffers when exposed to a red heat ; in the *London Pharmacopæia*, it is stated, that this should not be more than 16 per cent ; in the *Edinburgh*, 20 per cent. The presence of sulphates or chlorides may be detected by the same tests as given for bicarbonate of potash. Silica, which is occasionally present in carbonate of potash, may be detected by nitric acid when added to saturation, causing a cloudy precipitate in a solution in water.

THERAPEUTICAL EFFECTS.—As an antacid it may be employed in the same cases as the bicarbonate, but in consequence of its unpleasant taste, and irritant, even poisonous, properties, it is not much

used in medicine. The external application of the alkaline carbonates has recently been highly praised by Devergie, for the treatment of many obstinate diseases of the skin, particularly the various forms of papular and scaly eruptions, and the eruptive diseases of the scalp. I have used solutions of the alkaline carbonates with excellent effect in the treatment of many diseases of the skin, as first proposed by him, particularly in the various forms of papular, vesicular and pustular eruptions, but more especially in those seated in the scalp.* But although I sometimes use the carbonate of potash when the disease is very chronic, or of a non-inflammatory character, as in *porrigo capitis*, its acidity forbids its general employment. In pharmacy carbonate of potash is employed for the preparation of caustic potash, the bicarbonate, &c.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xx. largely diluted; for external use, gr. iij. to gr. v. may be dissolved in fʒj. of water, or made into an ointment with ʒj. of prepared lard.—*Potassæ carbonatis liquor*, D. L. (Pure carbonate of potash, ʒx. (3xx. L.); distilled water, (Oj.) dissolve and filter; "Specific gravity, 1310." D.) A convenient strength for internal use; Dose, min. x. to fʒj. in milk or in some aromatic water.

INCOMPATIBLES.—Same as the bicarbonate; but sulphate of magnesia is decomposed by the carbonate. In cases of poisoning with this salt, the antidotes are the same as those for solution of potash.

SODÆ BICARBONAS, D. E. SODÆ SESQUICARBONAS, L. *Bicarbonate of soda; Sesquicarbonate of soda.*

PREPARATION.—*Dublin*.—"Crystallized carbonate of soda of commerce, two pounds; distilled water, one quart; muriatic acid of commerce, one pint and a half; water, three pints; chalk, in fragments, one pound, or a sufficient quantity: having diluted the muriatic acid with the water, and dissolved the carbonate of soda in the distilled water, manipulate with these solutions, and with the chalk, as directed in the formula for *Potassæ Bicarbonas*, employing also the arrangement of apparatus there described. With the view, however, of obtaining from the mother liquor an additional quantity of bicarbonate, it is not necessary that the evaporation shall be preceded by a filtration." *Edinburgh*.—"Fill with fragments of marble a glass jar, open at the bottom, and tubulated at the top; close the bottom in such a way as to keep in the marble without preventing the free passage of a fluid; connect the tubulature closely by a bent tube and corks with an empty bottle, and this in like manner with another bottle filled with one part of carbonate of soda, and two parts of dried carbonate of soda, well triturated together; and let the tube be long enough to reach the bottom of the bottle. Before closing the last cork closely, immerse the jar to the top in diluted muriatic acid, contained in any convenient vessel; when the whole apparatus is thus filled with carbonic acid gas, secure the last cork tightly; and let the action go on till next morning, or till gas is no longer absorbed by the salt. Remove the damp salt which is formed, and dry it either in the air without heat, or at a temperature not above 120°." *Sesquicarbonate of Soda, London*.—"Carbonate of soda, lbvij.; distilled water, cong. j.; dissolve, and strain; then pass carbonic acid into the solution to saturation that the salt may subside; dry this, wrapped and pressed in cloth, with a gentle heat."

* See the Author's Treatise on The Eruptive Diseases of the Scalp, *passim*. Dublin, 1848.

PHYSICAL PROPERTIES.—Usually in the form of a fine, white powder, but sometimes met with in small indistinct crystals of the rectangular prism series; it is inodorous, but has a mild alkaline taste.

CHEMICAL PROPERTIES.—It is composed of one equivalent of soda, two of carbonic acid, and one of water. It is permanent in the air; by a moderate heat, the water and one equivalent of carbonic acid are expelled, and it is reduced to the state of carbonate. It requires 13 parts of water at 60° for its solution, but a much less quantity of boiling water; in the latter it loses one fourth of its acid, and becomes the sesquicarbonate. The solution is faintly alkaline; it effervesces with acids, but does not precipitate with the salts of magnesia. The term *sesquicarbonate* applied to the officinal preparation by the London College is an error.

Adulterations.—The only one of importance is with the simple or monocarbonate, and this is seldom wanting; it may be readily detected by the action of solution of corrosive sublimate, which gives a reddish-brown precipitate with a solution of the bicarbonate in 40 parts of distilled water, if it contain so much as a hundredth part of the carbonate.

THERAPEUTICAL EFFECTS.—In the various forms of dyspepsia attended with secretion of acid and vomiting, no remedy is so frequently employed as the bicarbonate of soda, being usually taken in solution with excess of carbonic acid. In lithiasis, and in gout and rheumatism where there is excessive secretion of uric acid and the urates, the potash preparations should be preferred to it, for the salt formed with soda and uric acid is extremely insoluble, being in fact the compound which is deposited in the joints of persons who suffer from repeated attacks of gout. Its use is highly injurious when there are phosphatic deposits in the urine. At page 16 I have referred to the employment of the alkaline carbonates and bicarbonates in the treatment of skin diseases; I have chiefly used the bicarbonate of soda in the form of ointment made with the simple cerate of the London Pharmacopœia, as unguents containing grease are in most instances productive of mischief in eruptions of the skin, more especially when they are seated on the scalp.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒss. dissolved in water.—*Liquor (Aqua, E.) Sodæ effervescens*, L. E. (Bicarbonate of soda, ʒj; water (distilled, L.), Oj.; dissolve; and in a proper apparatus, pass into it a stream of carbonic acid gas until it is more than saturated: keep in well stopped vessels.) This constitutes *Soda water*, the form in which the bicarbonate is most generally used; as met with in the shops, however, soda water is seldom anything more than a simple solution of carbonic acid in water, not containing any carbonate of soda; this may easily be known by adding some weak acid to the solution, as soon as it has ceased to effervesce after being poured from the bottle, when no further effervescence takes place, unless the alkaline carbonate be present. Dose, fʒvj. to fʒviij. two or three times a day. For external application, from twenty to thirty

grains of the bicarbonate of soda may be made into an ointment, with an ounce of cerate or cold cream.—*Trochisci Sodæ bicarbonatis*, E. (Bicarbonate of soda, ʒj.; pure sugar, ʒiij.; gum-arabic, ʒss.; pulverize them; and with mucilage beat them into a proper mass for making lozenges.) In acidity of the stomach, *ad libitum*.

INCOMPATIBLES.—Acids; lime water; muriate of ammonia; and metallic salts, except those of magnesia.

SODÆ CARBONAS IMPURA, L. *Impure carbonate of soda; Barilla.*

SODÆ CARBONAS CRYSTALLIZATUM, D. SODÆ CARBONAS, L. E. *Carbonate of soda.*

Impure carbonate of soda or barilla is obtained by burning to ashes several terrestrial plants which belong to the natural family *Chenopodiaceæ*, and which usually grow on the sea-shore. It is imported in the form of hard greyish-blue masses not deliquescent, packed in barrels. It is chiefly brought from Sicily, Teneriffe and the Canary Islands, and the East Indies. It is only employed for yielding carbonate of soda by the process mentioned below. In the present day, however, carbonate of soda is prepared on the large scale from common sea-salt by a complicated process, the details of which will be found in all modern works on chemistry, and it has consequently been introduced as an article of the *materia medica* into the last edition of the Dublin and Edinburgh pharmacopœias.

PREPARATION.—*London*. “Impure carbonate of soda, lbj.; distilled water, Oiv.; boil the salt in the water, and strain it while yet hot; lastly, set it aside that crystals may be formed.”

PHYSICAL PROPERTIES.—Carbonate of soda occurs in large, transparent crystals, or fragments of crystals, the primary form of which is an oblique rhombic prism. They are inodorous; but have a disagreeable, alkaline, somewhat caustic taste. Specific gravity, 1.623.

CHEMICAL PROPERTIES.—It is composed of one equivalent of soda, one of carbonic acid, and ten of water. It effloresces when exposed to the air; by heat it is fused in its water of crystallization, which is expelled, and a white anhydrous salt left, which again becomes liquid at a red heat, but is not decomposed. The crystals are soluble in twice their weight of water at 60°, and in their water of crystallization at 212°. The solution is powerfully alkaline.

Adulterations.—The impurities usually met with in carbonate of soda are sulphates and chlorides; they may be detected in the manner indicated, when these adulterations are present in carbonate of potash.

THERAPEUTICAL EFFECTS.—Carbonate of soda is not employed as an antacid so frequently as the bicarbonate, in consequence of its disagreeable taste; but it is very generally used in the dried state as an alterative in the diseases of infancy and childhood. In the treatment of the eruptive diseases of the skin already referred to (page

16,) given internally, and applied externally in the forms of ointment, liniment, or lotion, its employment is productive of the best results. I have for some time used it very extensively both in hospital and in private practice in the treatment of the various forms of eczema, impetigo, and herpes of the scalp, and have seldom seen it fail to effect a cure of these ordinarily intractable affections. In large doses carbonate of soda is corrosive and irritant, and may thus produce symptoms of poisoning by its local action on the mucous membrane of the stomach; the best antidotes are fixed oil and the vegetable acids.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to 3ss. dissolved in water; for external application from ʒj. to ʒij. may be dissolved in a pint of water, or an ointment prepared with from gr. x. to gr. xx. to the ounce of cerate or cold cream.—*Sodæ carbonas siccatum*, D. E. *Sodæ carbonas exsiccata*, L. ("Crystallized carbonate of soda of commerce, any convenient quantity: expose it in a porcelain capsule to a pretty strong sand heat, until the liquid which first forms is converted into a dry cake, and having rubbed this to powder, enclose it in a bottle," D. "Heat any convenient quantity (ʒj. L.) of crystallized carbonate of soda in a shallow vessel till it is dry; afterwards heat to redness, and reduce to powder," L. E.) Thus deprived of its water of crystallization, carbonate of soda may be given in the form of powder or pill; it has a very caustic taste, and therefore when given in powder, especially if to children, it should be combined with some bland substance, as gum tragacanth, to conceal its acrimony. Fifty-four grains of the dried carbonate of soda are equal to 144 grains of the crystallized salt. Dose, gr. v. to gr. xx.—*Sodæ carbonatis Liquor*, D. (Crystallized carbonate of soda of commerce, ʒjss.; distilled water, Oj.; dissolve and filter; the specific gravity of this solution is 1.026.)

INCOMPATIBLES.—Acids, and their salts; lime water; and magnesia.

CHAPTER II.

ANTHELMINTICS.

(Vermifuges.)

ANTHELMINTICS are remedies which possess the property of destroying worms, or of expelling them from the intestinal canal. Besides the specific or more immediate anthelmintics, which are only described in this division, many of the more active cathartics effect this purpose: and they should always be administered in conjunction with, or shortly after the specific remedies, the efficacy of which they tend much to increase. As the action of these remedies, however, is merely temporary, it will be requisite, as soon as the worms are expelled, to employ means calculated to restore the digestive organs to a healthy state, and to correct that peculiar condition of them which promotes the generation of intestinal worms. The means best calculated for this purpose are:—keeping the surface of the body warm by proper clothing, a light but nutritious diet with a moderate use of common salt, and at the same time the administration of bitter tonics with gentle aperients, and, if anemia be present, the preparations of iron. In children especially, the presence of worms in the intestinal canal is very apt to produce various spasmodic and nervous diseases which simulate epilepsy, chorea, hysteria, &c. In such cases antispasmodics are advantageously combined with vermifuges, and their use for some time after the worms have been expelled is absolutely requisite, as the habit, so to say, acquired by the system is with difficulty got rid of; for the removal of nervous affections thus caused, I have found the cold salt water shower bath with the internal administration of valerianate of zinc very efficacious.

ABSINTHIUM, L. E. *Wormwood.* The herb of *Artemisia absinthium*. Indigenous; belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnæan class and order *Syngenesia Superflua*.

BOTANICAL CHARACTERS.—An undershrub, 1-1½ foot high, erect, covered with silky hoariness; Leaves, bipinnatifid, downy, segments lanceolate; Flowers in erect leafy panicles, hemispherical, drooping, large, dingy yellow.

PROPERTIES.—The whole plant is aromatic and bitter, with a strong disagreeable odour. Its most important constituents are, bitter extractive, bitter resin, and a green volatile oil; it yields its properties to both water and alcohol. The herb, when carefully dried with a stove heat, retains its aroma and bitterness for a long time.

THERAPEUTICAL EFFECTS.—Wormwood is an excellent indigenous anthelmintic, possessing also tonic and stimulant properties, so that its use continued after the expulsion of the worms, prevents their reproduction. It is well adapted for giving tone to the digestive organs in debilitated habits.

DOSE AND MODE OF ADMINISTRATION.—In powder, 3ss. to 3j.; M. Cazin recommends it to be given in the form of wine, prepared by digesting an ounce of the herb with an equal quantity of garlic in a bottle of white wine; the dose of this is from f3j. to f3ij. every morning. *Infusum Absinthii*, (Wormwood, dried, 3iss.; boiling water, Oj.; infuse for an hour and strain). Dose, f3j. to f3ij.—*Tinctura Absinthii*, AMST. (Dry wormwood cut fine, one part; proof spirit, six parts; macerate for six days, express and filter). Dose, f3ij. to f3ss.

INCOMPATIBLES.—The sesqui-salts of iron; acetate of lead; and sulphate of zinc.

ALLIUM SATIVUM, L. E. *Garlic*. A native of Italy, Sicily, and the South of France, commonly cultivated in our gardens; belonging to the class *Hexandria*, order *Monogynia* in the Linnæan arrangement, and to the Natural family *Liliaceæ*.

BOTANICAL CHARACTERS.—Stem, a foot and a-half to three feet high, surrounded with many linear grass-like leaves, and bearing a head of many whitish flowers emerging from a membranous spatha.

PREPARATION.—The bulb is dug up for use in the month of August, cleaned and dried in the sun, and kept in bunches in a dry place.

PHYSICAL PROPERTIES.—The bulb, as it is termed, consists of several small bulbs, called cloves, grouped together within a common membraneous covering, which, when dry, is of a dirty whitish colour, and a withered aspect; the cloves have each their proper covering, they are white and succulent, of a strong, disagreeable, peculiar odour, and an acrid, pungent taste.

CHEMICAL PROPERTIES.—Garlic consists of an acrid volatile oil, fecula, albumen, and a saccharine matter; its medical properties depend on the volatile oil, which is heavier than water, of a yellowish colour, and a very penetrating odour; it is composed of 6 atoms of carbon, 5 of hydrogen, and 1 of sulphur (Wertheim).

THERAPEUTICAL EFFECTS.—Garlic, though now seldom employed as an anthelmintic in regular practice, is an excellent remedy in ascarides. Roque states that he has employed it with great suc-

cess; he gives the infusion by the mouth and in clyster, and at the same time causes friction to be made with a liniment of it over the abdomen.

DOSE AND MODE OF ADMINISTRATION.—In substance, ʒss. to ʒj. swallowed whole, or made into pills with soap; of the expressed juice, min. xx. to min. xxx. on sugar; of an infusion prepared by infusing ʒss. of the bulb in fʒij. of water or milk, fʒij. to fʒiij. two or three times daily.—*Syrup of Garlic*, (Garlic, one part; boiling water, eight parts; sugar, sixteen parts). Dose, fʒss. to fʒj.

FILIX-MAS, E. ASPIDIUM, L.—*The rhizome (root, L.) of Nephrodium (Aspidium, L.) filix-mas. Male Shield-fern.* Indigenous; belonging to the Linnaean class and order *Cryptogamia Filices*, and to the Natural family *Filices (Polypodiaceae, Lindley)*.

BOTANICAL CHARACTERS.—Rhizome or underground stem, large, tufted, scaly; producing in spring beautiful fronds or leaves, pinnate, with oblong, serrated, obtuse, leaflets.

PREPARATION.—The rhizome should be dug up in summer, cleared of root-fibres, &c. but not washed, and dried quickly and thoroughly in the open air, in the shade, without heat; the tufts, and those parts of the root-stock which are greenish internally, should alone be kept; they should be reduced to powder immediately, and preserved in well-stoppered bottles; the druggist's stock should be renewed annually, as in two years it loses its medical properties.

PHYSICAL PROPERTIES.—The powdered root is of a greenish-yellow colour, of a rather disagreeable odour, and has a nauseous, bitter, somewhat astringent taste.

CHEMICAL PROPERTIES.—It contains a small portion of an odorous volatile oil, on which its anthelmintic properties seem to depend; some fixed oil, fecula, uncrystallizable sugar, gum, and woody fibre.

THERAPEUTICAL EFFECTS.—The powder of the male fern-root is perhaps one of the most efficacious anthelmintics we possess in the treatment of tænia, and as an indigenous remedy it is especially worthy of attention. Bremser, however, in his treatise on intestinal worms, states that, “though an excellent remedy against *Bothriocephalus latus* (the tape-worm of the Swiss,) it is not so efficacious against *Tania solium* (the tape-worm of this country.)” It acts as a poison to the worms, as in all cases they are discharged dead.

DOSE AND MODE OF ADMINISTRATION.—Powder, ʒj. to ʒiij.; it should be given in the morning early, and followed in two hours afterwards by a brisk purge.—*Oleum Filicis-maris*, DR. PESCHIER. (The tufts of the rhizome are reduced to a moderately fine powder, exhausted with ether and the ethereal liquor distilled.) Dose, min. xx. to min. xxx. dropped on sugar, or made into an emulsion with almond mixture; half of this dose is given at bed-time, and the

remainder the following morning; if it do not purge, an active cathartic should be given in the afternoon of the same day.

GIGARTINA HELMINTHOCORTOS, (*Lameroux.*) *Corsican Moss*. A native of the shores of the Mediterranean about Corsica. The substance known in the shops as Corsican moss consists of fragments of a great variety of algæ; Decandolle enumerates no less than about five and twenty. A small, though the most essential part of the mixture, is the plant above named.

PHYSICAL PROPERTIES.—Corsican moss, as met with in commerce, consists of brownish filaments mixed with broken, irregular fronds, having whitish or greenish articulations; it has a strongly saline odour and a nauseous bitter taste.

CHEMICAL PROPERTIES.—It consists of vegetable jelly, the nature of which is not well known, vegetable fibre, salts of lime and soda, a trace of iron, manganese, and silica. Its active principle is soluble in water.

THERAPEUTICAL EFFECTS.—Corsican moss has been used by the natives of Corsica for several centuries, as a remedy for intestinal worms; it appears to be useful in cases of lumbrici, particularly when occurring in young children. Bremser speaks highly of its anthelmintic properties, which he ascribes to the chloride of sodium it contains.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to ʒij. made into an electuary with honey or treacle.—*Infusion of Corsican moss*, (Corsican moss, ʒiiss.; boiling water, fʒiv.). Dose, fʒij. to fʒss. in a cupful of water or milk.—*Jelly of Corsican moss*, P. (Corsican moss, ʒj.; sugar, ʒij.; white wine, fʒij.; isinglass, ʒss.; boil and strain). Dose, ʒj. to ʒij.

KOSSO OR COUSSO. *The dried flowers of Brayera anthelmintica*. This tree, belonging to the Natural family *Rosaceæ*, is a native of Abyssinia, in which country its flowers are a popular anthelmintic amongst the natives. They have been used more or less in France since 1824, and have within the last twelve months been introduced into England. It is not officinal in any of the British pharmacopœias.

BOTANICAL PROPERTIES.—A tree from twenty to thirty feet high, with round branches, alternate imparipinnate leaves, sheathing at the base, and small, greenish, diacious flowers in crowded panicles, resembling somewhat those of the elm.

PREPARATION.—The flowering panicles are gathered before the seeds are quite ripe, whilst still a number of florets remain unchanged, and are dried in the sun; for medicinal purposes they are reduced to powder.

PHYSICAL PROPERTIES.—The bunches of flowers are of a greenish-yellow colour, but when examined closely the edges of the

petals are purplish; they have a fragrant balsamic odour, when freshly opened, compared by Pereira to the combined odours of tea, hops, and senna leaves; the taste is slightly acrid and unpleasant.

CHEMICAL PROPERTIES.—According to the analysis of Wittstein, *Kosso* contains two varieties of tannin, a bitter acrid resin and a tasteless resin, a fatty oil, chlorophylle, water, sugar, gum, &c. Martin states that he has obtained from it a crystalline principle, soluble in alcohol and ether, and which he proposes to name *Kwoseïne*. The infusion and decoction are changed to a dark green colour by the sesqui-salts of iron.

Adulterations.—Owing to its scarcity and high price, *Kosso* is much adulterated, or rather a compound of, it is conjectured, powdered pomegranate bark and jalap is sold for it. The only security against the fraud is to purchase the flowers in the dried state, when it may be readily seen if they possess the characters above described.

THERAPEUTICAL EFFECTS.—This substance has for at least two centuries borne the highest repute amongst the Abyssinians, who are much afflicted with tape-worm, for its expulsion from the human intestines; and the experience of all who have tried it, both on the Continent for years back, and in England since its introduction, is confirmatory of this. It does not seem to produce any very manifest physiological effects, causing usually but slight nausea and a sensation of thirst; in some cases, however, it excites vomiting. Its action on the bowels is but slight, and the worms are often expelled alone, but it is more adviseable to give a mild purgative a short time before it has been taken. It manifestly acts as a poison to the parasites, for in one of the reported cases it brought away ten worms, of which one only exhibited signs of life, and that but for a few minutes. Its operation is admitted by all to be not alone effectual but safe, producing less disturbance of the system than most other remedies of this class; it is also equally effective, whether it be the *Tenia solium* or *Bothriocephalus latus* which is present in the intestines. But it must be remarked that although *Kosso* expels the tape worm, it is not a radical cure for the diseased condition of the system on which the production of the parasite depends.

DOSE AND MODE OF ADMINISTRATION.—From ʒiv. to ʒvj. for an adult; for children from ʒss. to ʒij. The following is the mode in which it is administered:—"The powdered flowers are to be mixed with luke-warm water, (for an adult about ten ounces,) and allowed to infuse for a quarter of an hour, a little lemon-juice is then to be swallowed, and the infusion being stirred up, the whole is taken, liquid and powder, at two or three draughts at short intervals, being washed down by cold water and lemon-juice. To promote the operation, tea (without sugar or milk,) may be taken. In three or four hours, if the remedy has not operated, a dose of castor-oil or a saline purgative should be administered." The dose should

be administered in the morning, fasting; the last meal of the previous evening should be a slight one; and the action of the remedy seems to be promoted by the use of a mild purgative on the day before it is taken.

MUCUNA, D. L. E. *Cowitch, or Cowhage. The hairs (hairy down, D.) from the pods of Mucuna pruriens, D. L. E.* This plant, Decandolle's nomenclature for which has been adopted in the British pharmacopœias, is a native of the West Indian islands, belonging to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley,) and to the Linnæan class and order *Diadelphia Decandria*.

BOTANICAL CHARACTERS.—A twining shrub, bearing purplish flowers, with a disagreeable, alliaceous odour, in axillary racemes; succeeded by coriaceous legumes, each containing three to five seeds.

PHYSICAL PROPERTIES.—The entire legumes, with the hairs attached, are usually imported; they are shaped like the letter *f*, of a brownish colour, from two to four or five inches long, thickly clothed with strong brown bristles or setæ, which, under the microscope, appear finely acuminate and serrated towards the point; these bristles separate easily and adhere obstinately to the skin, producing intolerable itching, accompanied by intense heat, and sometimes pain and swelling.

THERAPEUTICAL EFFECTS.—The operation of cowitch, as an anthelmintic, seems to be completely mechanical; the minute hairs wounding and irritating the worms, thus obliging them to let go their hold on the coats of the intestine, which is protected from injury by its mucous secretion. It is chiefly serviceable in cases of ascarides and lumbrici, having but little effect on the tape-worm; indeed by many practitioners it is esteemed, and probably not without reason, as the best vermifuge for the lumbrici.

DOSE AND MODE OF ADMINISTRATION.—The legumes are dipped in syrup, and then scraped, so as to remove the hairs; this process is repeated with fresh legumes until the syrup acquires the consistency of honey; of this a tea-spoonful is given to a child, or a table-spoonful to an adult, for three successive mornings before breakfast, and the last dose followed by a brisk purge.

PETROLEUM BARBADENSE, L. E. *Petroleum; Rock oil; Barbadoes tar.* A mineral production, found floating on the waters of springs and lakes in several of the West India Islands.

This substance has been very properly omitted from the last edition of the Dublin pharmacopœia, for although still retained by the London and Edinburgh colleges, it is altogether discarded from practice. It was formerly employed in cases of tape-worm, both

inwardly in the form of emulsion, and externally by friction over the abdomen.

PUNICA GRANATUM, RADICIS CORTEX, D. GRANATI RADIX, E. *Pomegranate bark; Bark of the root of Punica Granatum.*—A native of the North of Africa, introduced into the South of Europe, where it now grows freely; belonging to the Linnæan class and order *Icosandria Monogynia*, and to the Natural family *Myrtaceæ*.

BOTANICAL CHARACTERS.—A small handsome tree, growing to the height of twenty feet, with a brownish bark, and smooth leaves on short footstalks; it produces in July, at the extremities of the young branches, splendid rich-scarlet flowers, which are succeeded by the orange-like fruit, crowned with the hardened persistent calyx.

PHYSICAL PROPERTIES.—Pomegranate bark is usually met with in short quills, or portions of quills, of a greyish-yellow colour externally, yellowish internally, brittle not fibrous, with a faint odour, and an astringent not bitter taste.

CHEMICAL PROPERTIES.—According to Mitouart's analysis, it consists of tannin, wax, a sweetish substance (part of which is soluble in alcohol, and part in water, the former crystallizable, the latter having the characters of Mannite,) and free gallic acid in large quantity. Righini has recently discovered in it a peculiar acrid oleo-resinous principle, which he has named *Punicine*, and on which it is probable that its vermifuge properties depend.

Adulterations.—The root bark of the common barberry (*Berberis vulgaris*), and of the box tree (*Buxus sempervivens*), are said to be sometimes substituted for that of the pomegranate; the fraud is easily detected, as neither of these substances, although very bitter, possesses the least astringency.

THERAPEUTICAL EFFECTS.—The bark of the root of the pomegranate is an excellent vermifuge in cases of tape-worm, and is much employed in various parts of Europe; but it is chiefly used in India, where it is said scarcely ever to fail, if properly administered; some practitioners state, that it should not be employed unless joints of the worm have already come away naturally.

DOSE AND MODE OF ADMINISTRATION.—Two ounces of the bruised bark, stripped from the fresh root if possible, are macerated for twenty-four hours in two pints of water, then boiled to one-half, and filtered; this is given in three doses, with an interval of half an hour between each dose; vomiting frequently occurs after the first or second dose, but this should not prevent us from administering a third. Soon afterwards the patient passes many stools in which joints of the worm are expelled. The doses should be occasionally repeated for four or five days after fragments of the worm have ceased to come away.

SABADILLA, L. E. *Cevadilla*. Fruit of *Helonias officinalis*, L.—of *Veratrum Sabadilla*, of *Helonias officinalis*, and probably of other *Melanthaceæ*, E. This plant, which has been named *Asagraea officinalis* by Lindley, and *Schænocaulon officinale*, by Gray, is a native of Mexico, belonging to the Linnæan class and order *Polygamia Monœcia*, and to the Natural family *Melanthaceæ*.

BOTANICAL CHARACTERS.—A bulb, sending up numerous grassy leaves, from the centre of which springs an annual stem, about six feet in height, terminated by a spike of small white flowers, succeeded by numerous trifollicled capsules.

PHYSICAL PROPERTIES.—The fruit consists of three follicles, oblong, adherent at the base, about half an inch in length; they are composed of a thin, yellowish, elastic membrane, containing from one to three shining black seeds; the seeds have little odour, but when powdered and snuffed into the nostrils, they produce violent sneezing and a discharge of mucus; they have an acrid, intensely bitter taste, which is very permanent.

CHEMICAL PROPERTIES.—Cevadilla consists of fatty matter, *cevadie acid*, wax, *veratria* combined with gallic acid, yellow colouring matter, and gum.

THERAPEUTICAL EFFECTS.—Although possessed of highly poisonous properties, cevadilla has been employed internally as an anthelmintic with much success in cases of tape-worm, and of ascarides; its use has hitherto been almost entirely confined to the Continent, and from the numerous instances of its successful employment recorded by different practitioners, it appears deserving of a high character as a vermifuge. (See, also, *General Stimulants*).

DOSE AND MODE OF ADMINISTRATION.—Cevadilla should be administered with caution, and its use always commenced with very small doses, in order to ascertain how far it will be borne by the digestive organs. M. Cazin, of Boulogne, who has had much experience in vermifuge remedies, prescribes it as follows:—"For children, from a grain and a-half to four or five grains of the powdered seeds, mixed with syrup of rhubarb; and for adults, eight or more grains, with the addition of a little sugar and a few drops of oil of fennel;" in every case he repeats the dose daily for four days, after which he administers for some time the infusion of chamomile. *Enema of Cevadilla*, (Cevadilla, ʒij.; water, fʒx.; milk, fʒiij.; the cevadilla is boiled in the water, until it is reduced to seven ounces, then filtered, and the milk added). To be administered in cases of ascarides.

SANTONINE.—This is the active principle of *Worm-seed*, the *semen-contra* of the older pharmacutists. *Worm-seed* has been omitted from the last edition of the Dublin pharmacopœia; as sold in the shops, it appears to be a mixture of flower-buds with their foot-stalks, and according to Guibourt, that which is imported from

the Levant is obtained from the *Artemesia contra* of Linnæus, which belongs to the Natural family *Compositæ*. There is much difficulty in procuring *Santonine* in a pure state, and it consequently bears a very high price. M. Gaffard has proposed the following process for obtaining what he calls brown or impure santonine, and which he has found to act very efficaciously when ascarides or lumbrici are present in the intestines.

PREPARATION.—*Brown Santonine.*—Take of Aleppo worm-seed three ounces; carbonate of potash one ounce; slaked lime, sifted, half an ounce; water, from three pints to three pints and a-half. Place the mixture on the fire, stirring occasionally with a wooden spatula; let it boil for an hour; on removing it from the fire, pass it with expression through a linen cloth, let it settle, decant, and add hydrochloric or nitric acid until it reddens litmus without being sensibly acid to the tongue, allow it to rest, pass it through a filter previously moistened, or through a piece of close canvas, and allow the product which remains on the filter to dry in the open air until it acquires the consistence of firm butter.

DOSE AND MODE OF ADMINISTRATION.—This preparation is best given in the form of lozenges, which may be prepared as follows:—Brown santonine, $\mathfrak{z}\text{ij}$.; powdered sugar, $\mathfrak{z}\text{xij}$.; powdered gum, $\mathfrak{z}\text{iss}$.; essential oil of lemon, min. xxv . Place the brown santonine in a marble mortar; add by degrees, and with constant trituration, the sugar mixed with the essential oil and the gum, so as to make a homogeneous powder. Form with a sufficient quantity of water a mass of the desired consistence, and divide it into lozenges, each of which shall weigh, when dried, fifteen grains; each lozenge will then contain somewhat more than one-third of a grain of brown santonine. For infants under six months the dose will be one lozenge night and morning; from six months to a year, two lozenges night and morning; from one to two years, three, and from two to four years, four, night and morning; for children of five years and upwards, a lozenge for each year of the child's age should be given, night and morning. The medicine to be continued until the desired effects are no longer produced.

SPIGELIA, L. E. *Root of Spigelia Marilandica; Carolina-pink; Worm-grass.* A native of the United States; belonging to the Linnæan class and order *Pentandria Monogynia*, and to the Natural family *Gentianaceæ* (*Loganiaceæ*, Lindley).

BOTANICAL CHARACTERS.—A perennial root; sending up numerous simple stems; bearing, in the month of July, rich carmine-coloured flowers, in racemes.

PHYSICAL PROPERTIES.—Usually met with in bundles of the entire plant, about twenty inches long. The officinal part consists of numerous, yellowish-brown fibres, proceeding from a small, dark-brown rhizome. They have a faint odour, and a bland, somewhat nauseous taste.

CHEMICAL PROPERTIES.—The root consists of acrid resin, tannin, bitter extractive, and woody fibre, with a trace of fixed oil.

THERAPEUTICAL EFFECTS.—*Spigelia* root, in consequence of its being much more active in the recent state than when dried, bears a higher character as an anthelmintic in America than in Europe, and being, therefore, not much used in this country, has been omitted from the last Dublin Pharmacopœia. It is the most popular vermifuge in the United States for the expulsion of lumbrici, possessing, however, little or no powers over any other species of intestinal worm.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to gr. xx. for children. *Infusum Spigeliæ*, U. S. (*Spigelia* root, ʒss.; boiling water, fʒxvj.; macerate for two hours and strain). Dose, fʒss. to fʒj. for a child, four times the quantity for an adult. However administered, it should always be followed by a strong mercurial purge.

STANNI PULVIS, D. L. E. Powder of Tin. Tin is found in nature chiefly in the form of Peroxide, existing in large quantities in Cornwall, in South America, and in the East Indies.

PREPARATION.—"Grain tin, a convenient quantity: melt the tin in a black lead crucible, and while it is cooling, stir it with a rod of iron until it is reduced to powder. Let the finer particles be separated by means of a sieve, and when, after having been several times in succession shaken with distilled water, the decanted liquor appears quite clear, let the product be dried and preserved for use."—*Dublin*. "Melt tin in an iron vessel; pour it into a mortar previously heated rather above the fusing point of the metal; triturate briskly as it cools, ceasing as soon as a considerable proportion is finely pulverized; sift the product, and repeat the process with what is left in the sieve."—*Edinburgh*.

PHYSICAL PROPERTIES.—Metallic tin is of a bluish-white colour, brilliant, soft, and malleable, with but little tenacity; it emits a slight peculiar odour when rubbed. Specific gravity 7.3.

CHEMICAL PROPERTIES.—It melts at 442° F.; if the heat be increased, it oxidises rapidly, and at a red heat burns brightly; it dissolves slowly in dilute hydrochloric acid, but rapidly if the acid be strong and boiling; nitric acid slightly diluted acts on tin with great violence, heat is produced, orange fumes disengaged, and pure peroxide of tin is formed.

Adulterations.—Pewter filings are sometimes substituted for tin filings in commerce; and Christison says, that lead powder is not unfrequently sold for powder of tin. These adulterations may be detected by first acting on the specimen with nitric acid, so as to convert it into the peroxide, boiling the powder thus obtained with distilled water, when, should the tin be pure, the water will not precipitate with solution of sulphate of magnesia.

THERAPEUTICAL EFFECTS.—Powder of tin is a most effectual anthelmintic, especially for children, in cases of lumbrici; not so use-

ful in cases of ascarides, and producing little or no effect in cases of tænia. It appears to act mechanically, and consequently its administration should always be followed by an active cathartic.

DOSE AND MODE OF ADMINISTRATION.— $\bar{3}$ ss. to $\bar{3}$ j. made into an electuary, with an equal quantity of honey or treacle.

TEREBINTHINÆ OLEUM, D. L. E. *The volatile oil distilled from the liquid resinous exudation* (TEREBINTHINA VULGARIS, L.) *of various species of Pinus and Abies, E.—of Pinus Sylvestris, D. L. Oil of turpentine; Spirits of turpentine.* The trees from which the varieties of common turpentine met with in commerce are procured, are inhabitants of the forests of the colder regions of Europe and North America, and most of them are cultivated in the British isles; they are placed in the Natural family *Coniferæ* (*Pinaceæ*, Lindley), and in the Linnæan class and order *Monœcia Monadelphica*.

PREPARATION.—*Common Turpentine, Terebinthina vulgaris*, is procured in America, by cutting off the outer bark near the root of the tree, and making an incision through the inner bark into the wood; as the turpentine exudes, it flows into a hole dug in the earth, whence it is removed into casks. *Volatile oil of turpentine* is an article of the *Materia Medica* in the three British Pharmacopœias, being always prepared by the manufacturer on the large scale. This oil is directed to be further purified by the London and Edinburgh Colleges. *Oleum Terebinthinæ purificatum*, L. E. (Oil of turpentine, Oj.; water, Oiv.; distil cautiously so long as oil passes over with the water).

PHYSICAL PROPERTIES.—Oil of turpentine is a transparent, nearly colourless, limpid fluid; of a peculiar, penetrating, balsamic odour; and a pungent, bitter, disagreeable taste. Specific gravity, $\cdot 872$ at 50° F.

CHEMICAL PROPERTIES.—Its composition is $C^{20} H^{16}$. It is very soluble in ether, less so in alcohol, and very sparingly soluble in water. Exposed to the air it gradually absorbs oxygen, thickens, and becomes yellowish. It boils at 314° , and cooled down to -17° it deposits white crystals, *stearopten*, which are heavier than water. Oil of turpentine is very inflammable, burning with a heavy, yellowish flame, and much smoke; in chlorine gas it takes fire spontaneously.

THERAPEUTICAL EFFECTS.—As the most effectual remedy we possess for the expulsion of tape-worm, oil of turpentine stands deservedly in high repute. It operates as a specific poison to the parasite, causing its immediate death, and afterwards, in consequence of its cathartic properties, expelling it from the body. It has been also used with much benefit in the form of enema for ascarides in the rectum. (See, *Cathartics, Diuretics, Epispastics, and General Stimulants*).

DOSE AND MODE OF ADMINISTRATION.—As an *anthelmintic*; for adults, $\bar{f}\bar{3}$ ss. to $\bar{f}\bar{3}$ j.; for children, $\bar{f}\bar{3}$ j. to $\bar{f}\bar{3}$ ss. It may be given either floating on the surface of water, or made into an emulsion

with mucilage, (of which it requires equal portions), or with yolk of egg, (one to every ounce).—*Confectio Terebinthinæ*, D. (Oil of turpentine, f3j.; liquorice root, in powder, 3j.; clarified honey, *by weight*, 3ij.: rub the oil of turpentine with the liquorice powder, then add the honey, and beat them all together into a uniform consistence.) This form has been adopted from Dr. Copland's Dictionary of Practical Medicine. It is miscible with water, for which it is well adapted, but in the solid state it is very nauseous. The dose, as an *anthelmintic*, is from 3ij. to 3iv. for adults, and from 3ss. to 3j. for children.—*Enema Terebinthinæ*, D. L. E. Oil of turpentine, f3j.; (yolk of egg, a sufficiency, L. E.); mucilage (decoction, L.) of barley (water, E.), f3xvj. (f3xix, L. E.); mix, (rub the oil and the yolk carefully together, and then add the water gradually, E).

CHAPTER III.

ANTISPASMODICS.

ANTISPASMODICS, as their name indicates, are medicines which counteract irregular or inordinate muscular action—*spasm*. This deranged state of the system depends on so many different causes, and is produced by so many different sources of irritation, that its successful treatment will very frequently depend on the employment of remedies calculated to remove the more immediate cause or source of irritation, by which the spasmodic affection is produced. It follows, therefore, that under peculiar circumstances the remedies which will be found most successful in counteracting spasm, must be derived from very different divisions of the *Materia Medica*; and thus the term Antispasmodic will become applicable to a *narcotic*, a *sedative*, a *nauseant*, an *anæsthetic*, a *stimulant*, a *cathartic*, or a *tonic*; and in some cases remedies which directly depress the vital powers, such as general blood-letting and the prolonged use of the warm-bath, are the most effectual means of subduing spasm. There are, however, certain medicines which appear to exert a direct control over spasmodic action independently of any influence upon its exciting causes, and these will form the subject of our inquiry in the present chapter. The precise mode in which these agents produce their effects is not well understood, and the present extent of our knowledge regarding them is only that they act on the nervous system, from deranged conditions of which the state demanding their employment arises. Many of the substances contained in this class of medicines have a powerful, usually disagreeable odour, such as *assa-fœtida*, *galbanum*, *valerian*, &c.; and we consequently find that the older therapeutists included amongst them all remedies possessing these properties; in the present day, however, the number of *pure* antispasmodics is much diminished, and it is probable that as our knowledge of therapeutics advances, this *sub-division* of medicines will be abolished. The prescriber must remember that antispasmodics vary in their effects on different individuals probably more than any other remedies, also, that by repetition their power diminishes rapidly, and that their effects are manifested quickly, but are very evanescent.

ASSAFOETIDA, D. L. E. *Gummy-resinous exudation of Narthex assafoetida*, D. of *Ferula assafoetida*, L. E.—Probably also of *Ferula Persica*, E. A native of Persia, especially the provinces of Khorasan and Laristan; belonging to the Linnaean class and order *Pentandria Digynia*, and to the Natural family *Umbelliferae* (*Apiaceae*, Lindley.)

BOTANICAL CHARACTERS.—The root is long, tapering, of the thickness of a man's leg, black externally, white and juicy internally; of a powerful alliaceous odour, sending up many radical leaves, about two feet long; and after some years a round stem clothed with leafless sheaths, eight or nine feet high, and bearing yellow flowers in umbels, succeeded by flat thin reddish-brown fruit. The whole plant dies after it has once flowered and ripened its seed.

PREPARATION.—When the plant is four years old, the root-leaves are removed, and in forty days afterwards the top of the root is sliced off, a fetid juice exudes, which concretes in a couple of days, is then scraped off, and a fresh slice of the root made—more juice exudes, is collected as above, and the same process repeated from ten to twelve times within six weeks—until the root is completely exhausted. The juice is exposed to the sun to become harder, and then packed in casks and cases, which are sent, by way of Bombay, to Europe.

PHYSICAL PROPERTIES.—Assafoetida is met with in commerce in irregular lumps from half a pound to three pounds in weight; of a pinkish-yellow and reddish-brown colour externally; when recently cut, of a pearl-white colour with a waxy lustre, but on exposure to the air rapidly acquiring a rose tint. It has a powerfully disagreeable, peculiar, alliaceous odour, and a strong, bitter, acrid taste. Specific gravity, 1.31 to 1.35.

CHEMICAL PROPERTIES.—It is composed of 65 per cent of resin, 3.60 of volatile oil, 19.44 of gum, 11.66 of bassorine, with traces of saline matter, sulphate and carbonate of lime, extractive, lignin, &c. (Pelletier). The resin and volatile oil are the medicinal principles. Exposed to the air it is apt to become very hard owing to the presence of the sulphate of lime, the *setting* of which is supposed to be the cause. Assafoetida softens with a moderate heat; and is inflammable, burning with a fuliginous flame. It is partially soluble in alcohol, ether and vinegar; and it may be formed into an emulsion with water. It is reduced to powder with difficulty, unless it be triturated with carbonate of potash.

THERAPEUTICAL EFFECTS.—Assafoetida is a powerful stimulating antispasmodic, especially adapted for the spasmodic nervous diseases of females, as hysteria and some forms of chorea and epilepsy. No remedy we possess is so successful in the treatment of hysteria, administered either during the paroxysm or in the interval, especially when given in large doses, by which means alone its full benefit in this disease can be obtained; in a hysteric paroxysm, we are frequently unable to administer medicines by the mouth, when, given in the form of enema, assafoetida is found to be very effectual. In the convulsions of infants, especially when dependant on flatulence, and in the flatulent constipation of the aged, few remedies are more efficacious. It has also been employed with much benefit in the chronic spasmodic stage of hooping cough, in pure spasmodic asthma,

and in that peculiar spasmodic difficulty of breathing, so frequently the attendant of chronic catarrh. Assafoetida has also been used as a vermifuge.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒss. in pills or emulsion.—*Mistura Assafoetidæ*, L. (Assafoetida, ʒv.; water, a pint; rub the assafoetida with the water, gradually poured in, until an emulsion is formed). Dose, fʒss. to fʒiiss; used also as an enema for children.—*Tinctura Assafoetidæ*, D. L. E. (Assafoetida, in small fragments, ʒv.; rectified spirit, Oij.; macerate for 14 (7, E.) days (express, D.) and filter). Dose, fʒss. to fʒiij.—*Spiritus Ammoniacæ fetidus*, D. L. E. (“Assafoetida, ʒiiss.; rectified spirit, Oiss.; stronger solution of ammonia, fʒiij.; break the assafoetida into small pieces, and macerate it in the spirit for twenty-four hours; then distil off the entire of the spirit, and mix the product with the solution of ammonia. The specific gravity of this preparation is .849.” D. “Hydrochlorate of ammonia, ʒx.; carbonate of potash, ʒxvj.; rectified spirit; and water, of each, Oij.; assafoetida, ʒv.; mix and distil, with a slow fire, three pints,” L. “Spirit of ammonia, fʒxss.; assafoetida, ʒss.; break the assafoetida into small fragments; digest it in the spirit for twelve hours; distil over fʒxss. by means of a vapour bath;” E.) Dose, fʒj. This is merely a solution of the volatile oil of assafoetida in the spirit of ammonia.—*Pilulæ Assafoetidæ compositæ*, D. (Assafoetida, ʒij.; galbanum; myrrh; treacle, by weight, of each, ʒj.; heat all the ingredients in a capsule, by means of a steam or water bath, and stir the mass until it assumes a uniform consistence.)—*Pilulæ Galbani compositæ*, L. (Assafoetida, ʒss.; myrrh; and sagapenum, of each, ʒiiss.; galbanum, ʒj.; syrup, a sufficiency).—*Pilulæ Assafoetidæ*, E. (Assafoetida; galbanum; and myrrh, of each, three parts; conserve of red roses, four parts, or a sufficiency). Dose, gr. x. to ʒj.—*Enema fetidum*, D. E. (“Tincture of assafoetida, fʒij.; warm water, fʒij.; mix,” D. “Add two drachms of tincture of assafoetida to the enema catharticum,” E.).—*Emplastrum Assafoetidæ*, E. (Litharge plaster; and assafoetida, of each, ʒij.; galbanum; and bees' wax, of each ʒj.; liquefy the gum resins together and strain them, then add the plaster and wax also in the melted state, and mix all thoroughly). Applied externally in hysteria, flatulence, and hooping cough.

CASTOREUM, D. L. E. *A peculiar secretion (concretion, L.), from the follicles of the prepuce of castor fiber; Castor.* The beaver, an inhabitant of the Northern parts of Europe and North America, is placed by Cuvier in the class *Mammalia*, order *Rodentia*. Both the male and female beavers are furnished with castor sacs. In the living animal the secretion contained in them is fluid, but when removed from the animal it concretes rapidly.

PHYSICAL PROPERTIES.—As met with in commerce, North American castor (the only kind now imported into Britain) consists

of the two sacs united together by a kind of natural ligament; they are wrinkled; of a reddish brown colour externally, paler internally; breaking with a somewhat resinous fracture; sometimes quite hollow in the centre. It has a strong, peculiar, disagreeable odour, and a somewhat aromatic, bitter taste.

CHEMICAL PROPERTIES.—It contains volatile oil (*Carbolic acid*), resin, albumen, a peculiar principle discovered by Brandes and named by him *Castorine* and to which he says it owes its properties, fatty matter, mucus, carbonate of lime, and salts of soda and potash. Castor yields its active principles almost entirely to alcohol, and but very imperfectly to water.

THERAPEUTICAL EFFECTS.—Castor was formerly in high esteem as an antispasmodic, but in the present day has nearly fallen into disuse, its employment being restricted to some of the milder forms of hysteria, in which any benefit it produces is probably owing to its nauseous smell and taste.

DOSE AND MODE OF ADMINISTRATION.—In substance from ʒj to ʒij.—*Tinctura Castorei*, L. E. (Castor, powdered (bruised, E.), ʒiiss.; rectified spirit, Oij.; macerate for seven (fourteen, L.) days and strain, “may also be prepared by percolation, like tincture of cassia;” E.). Dose, fʒij. to fʒiv.—*Tinctura Castorei composita*, E. (Castor bruised, ʒiiss.; assafoetida in small fragments, ʒx.; spirit of ammonia, Oij.; digest in a well-closed vessel for seven days, strain and express strongly the residuum, and filter. This tincture cannot be so conveniently prepared by the method of percolation.) Dose, fʒj. to fʒij.

FULIGO LIGNI, *Wood soot*, formerly contained in the British Pharmacopœias, is still much used on the continent, and for some years back has been employed with excellent effect, as an antispasmodic, by many physicians in this city. It has been found most beneficial in the latter stages of hooping-cough in children, and in some forms of hysteria. It is prepared by burning wood under a small flue, and collecting the soot which is deposited in the chimney. It consists of a peculiar extractive matter called *pyretin*, some acetic acid, acetates of soda, potash, magnesia, and ammonia, creasote, &c. It yields its active properties partly to water, but more completely to alcohol. The preparations of soot that have been employed are as follow:—*Decoctum Fuliginis*, (Wood soot, ʒiv.; boiling water, Oiss.; boil down to Oj. and strain). Only used as an external application to chronic eruptions of the scalp, and to obstinate ulcers.—*Tinctura Fuliginis*, (Wood soot, ʒij.; assafoetida, ʒj.; proof spirit, fʒxxxij.; digest for three days and strain.) Dose, fʒj. to fʒij.—*Spiritus Fuliginis*, (Wood soot, one part; proof spirit, five parts; water, fifteen parts; distil four parts). Dose, min. xx. to min. xxx. *Extractum Fuliginis*, (Wood soot, 1 part; boiling water, 8 parts; boil for fifteen minutes, strain through linen, and evaporate to a proper consistence.) Dose, gr. v. to gr. x.

GALBANUM, D. L. E.—*Concrete gummy-resinous exudation of Opöidia galbanifera, D.—probably of a species of Opöidia, E.—of Galbanum Officinale, L.*) The plant which yields Persian galbanum is that indicated by the Dublin College; it belongs to the natural family *Umbelliferae* (*Apiaceae*, Lindley), and to the Linnæan class and order *Pentandria Digynia*. It is imported from India, and from the Levant.

PHYSICAL PROPERTIES.—It occurs both in tears and in lump; the tears are globular, irregular, about the size of a pea, usually agglutinated into masses of a pale greenish-yellow colour, somewhat translucent, having a strong peculiar odour, and an acrid, disagreeable, bitter taste; the lump variety is of a darker colour, rather opaque, with a less powerful odour and taste; when exposed to cold both kinds become brittle, and may be readily reduced to powder.

CHEMICAL PROPERTIES.—Galbanum consists chiefly of resin and gum, with a small proportion of volatile oil, and malate of lime. It is almost entirely soluble in proof spirit, and partially so in rectified spirit and in ether; it forms an emulsion with water, and is rendered softer, but not melted by heat.

THERAPEUTICAL EFFECTS.—Galbanum is employed in the same cases as assafoetida, with which it is generally combined, being less energetic than that substance. It is more frequently employed externally, as a stimulating antispasmodic, being better suited for plasters in consequence of its consistence.

DOSE AND MODE OF ADMINISTRATION.—In substance, either in pill or emulsion, gr. x. to gr. xx.—*Emplastrum Galbani*, L. (Galbanum, ʒviiij.; lead plaster, lbij; common turpentine, 3x.; resin of the Spruce Fir powdered, ʒiiij.; Add first the resin, then the plaster melted with a slow fire to the galbanum and turpentine melted together, and mix them all). Applied externally, spread on leather.

MOSCHUS, D. L. E.—*Inspissated secretion found in the follicle of the prepuce of Moschus moschiferus; Musk.* The musk animal, an inhabitant of the mountains of Eastern Asia, especially frequenting the steppes of the Altai, the banks of the river Irtysch, Mongolia, Thibet and Butan, as far as Tonquin, is placed by Cuvier in the class *Mammalia*, order *Ruminantia*. In the male animal, immediately in front of the præputial orifice, is situated a small sack filled with a viscid fluid, which in the dry state constitutes musk. It is imported into the British market principally from China.

PHYSICAL PROPERTIES.—The musk-bag, or as it is commonly called musk-pod, is somewhat oval, about $2\frac{1}{2}$ inches long, and $1\frac{3}{4}$ inches broad, smooth and bare on one side, somewhat convex, and covered with stiff, brownish-yellow hairs on the other; it contains from ʒiss. to ʒiiij. of musk. Musk is in the form of small unctuous grains, of a deep reddish-brown colour, mixed with whitish hairs; it has a strong, peculiar, diffusible, very persistent odour, and a bitter aromatic taste.

CHEMICAL PROPERTIES.—Musk consists of ammonia, stearine, elaine, cholesterine, acid oil combined with ammonia, volatile oil, an undetermined acid, gelatin, albumen, fibrine, carbonaceous matter, and numerous salts, (*Guibourt and Blondeau.*) It yields its active principles partially to water, but more completely to alcohol.

Adulterations.—Grain musk is usually adulterated; dried bullocks' blood is employed for this purpose; it may be detected by adding to an infusion of the suspected drug solution of corrosive sublimate; if it be genuine it will not precipitate. Spurious musk-bags are not uncommon in commerce, they are most easily detected by the microscopic characters of the hairs with which they are covered, as I first pointed out in the *Dublin Quarterly Journal*, Vol. I. n. s. p. 77. The hairs of the true musk-bag are furnished internally with distinct, regular, colour cells; while none can be perceived in those found on the spurious pods.

THERAPEUTICAL EFFECTS.—Musk is not much prescribed now in consequence of its high price; it is nevertheless a stimulating antispasmodic of great power, and is administered with excellent effect in hysteria, in chorea, and in the subsultus tendinum and hiccough of fevers and other diseases assuming a typhoid type. In cases of hysteria of long standing, so nearly allied to epilepsy as to be scarcely distinguishable from it, I have obtained very beneficial results from the employment of musk.

DOSE AND MODE OF ADMINISTRATION.—In substance, gr. x. to gr. xx.—*Misturi Moschi*, L. (Musk; gum arabic, powdered; and sugar, of each, ʒiij.; rose water, Oj.; rub the musk with the sugar, then with the gum, the rose water being gradually poured in). Dose, fʒi. to fʒij.

INCOMPATIBLES.—Sulphate of iron; nitrate of silver; corrosive sublimate; and infusion of bark.

OPOPANAX, L. *Gum-resin of Opopanax chironium.* This plant is a native of the South of Europe. It belongs to the Linnæan class and order *Pentandria Digynia*, and to the Natural family *Umbelliferae* (*Apiaceæ*, Lindley). Opopanax is obtained by incisions into the root; it occurs in reddish-yellow tears, possessing a somewhat fetid but faint odour, with a bitterish acrid taste; it consists chiefly of gum and resin with a small quantity of volatile oil, starch, and extractive matter. This substance is quite obsolete in medical practice; it was formerly employed in the same cases as assafœtida and galbanum, which it resembles in its physiological properties.

RUTA, L. E. *Rue; Leaves, (and unripe fruit, E.) of Ruta graveolens.* A native of the South of Europe, cultivated in our gardens. It belongs to the Natural family *Rutaceæ*, and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL PROPERTIES.—A small branching shrub; with glaucous bluish-green leaves, and yellow flowers in umbellate racemes.

PHYSICAL PROPERTIES.—Although the leaves only are ordered by the London College, the entire plant is met with in the shops. It has a strong, disagreeable, somewhat aromatic odour in the fresh state, much of which is lost in drying; and a bitter, acrid, unpleasant taste.

CHEMICAL PROPERTIES.—Its medicinal properties depend on volatile oil, and bitter extractive; the former, *Oleum Rutæ*, is officinal in the Edinburgh pharmacopœia; it is obtained by distilling the fresh herb with water. Oil of Rue is of a rich yellow colour, becoming darker by age; it has the peculiar odour of the plant in a marked degree, and a bitter, acrid, warm taste; its specific gravity is 0.911. Rue yields its active properties to boiling water, but by decoction the volatile oil is dissipated.

THERAPEUTICAL EFFECTS.—Rue is a stimulating antispasmodic of some power, although not much employed in the present day. It has been administered with benefit in the spasmodic colic and general convulsions of children; and in the hands of some practitioners is said to have proved useful in hysteria and idiopathic epilepsy.

DOSE AND MODE OF ADMINISTRATION.—Preparations of the fresh herb should always be employed, as the infusion (prepared by infusing ʒj. of the herb in Oj. of boiling water, in a covered vessel, for an hour); or the oil: the dose of the former is fʒj. to fʒij.; of the latter min. ij. to min. v. in some agreeable syrup.—*Confectio Rutæ*, L. (Rue, dried; carraway; bay berries, of each, ʒiss.; sagapenum, ʒss.; black pepper, ʒij.; despumated honey, ʒxvj.; rub the dry ingredients together to a very fine powder and preserve them; then, whenever the confection is to be used, add the honey to them, and mix them all.) Only used in enemata in the spasmodic affections of infants and children. From ʒj. to ʒj. is added to fʒvj. or fʒviii. of thin gruel.

SAGAPENUM, L. *Gum-resin of an uncertain species of Ferula.* Imported from the Levant.

PHYSICAL PROPERTIES.—It occurs in semi-translucent masses of a dark brownish-yellow colour, consisting of numerous tears agglutinated together; it has a fetid odour, weaker than assafœtida, and a hot, acrid taste; it breaks with a horny fracture.

CHEMICAL PROPERTIES.—According to the analysis of Pelletier, sagapenum consists of gum, resin, volatile oil, bassorine and some salts.

THERAPEUTICAL EFFECTS.—Sagapenum produces effects precisely similar to, but weaker than, assafœtida; it is consequently scarcely ever employed now.

DOSE AND MODE OF ADMINISTRATION.—In substance, given in the form of pill, gr. v. to gr. xx.—*Pilula Sagapeni composita*, L. (Sagapenum, ʒj.; aloes, ʒss.; syrup of ginger, a sufficiency; beat to-

ther until they are incorporated.) Dose, gr. v. to gr. xx. A useful purgative and antispasmodic in the flatulent colic of dyspepsia.

SUCCINUM. D. L. *Amber.* The oil (*Oleum Succini*), is still retained in both the Dublin and London pharmacopœias.

PREPARATION.—*Oleum Succini* is an article of the *Materia Medica* in the Dublin pharmacopœia. The London College directs it to be prepared as follows:—"Put amber into an alembic, so that an acid liquor, an oil, and a salt contaminated with the oil, may distil in a sand-bath, with a heat gradually increased. Afterwards let the oil distil again and a third time."

Although once highly esteemed in medicine as an antispasmodic, this preparation possesses really such feeble medicinal properties, and is so little employed in the present day, that I may very well omit any account of it here. The dose of the oil is from min. v. to min. x.; that of the acid, which was at one time employed, from gr. v. to gr. viij.

VALERIANA, D. L. E. *Root of Valeriana officinalis.* An indigenous plant, belonging to the Linnaean class and order, *Triandria Monogynia*, and to the Natural family, *Valerianaceae*.

BOTANICAL CHARACTERS.—The root is tuberous, perennial, sending up a smooth erect furrowed stem, from two to four feet high, which produces rose-coloured flowers in a somewhat paniced corymb.

PHYSICAL PROPERTIES.—The root, which should be dug up in autumn when the leaves have decayed, or in spring before the stem rises, consists of a short tuberous root-stock, and numerous root fibres from two to six inches long, yellowish-brown externally, whitish internally, of a strong, penetrating, characteristic odour, and a bitter acrid, somewhat aromatic taste. The roots of those plants which grow on the banks of rivers or in marshy places, are inert.

CHEMICAL PROPERTIES.—It consists of woody fibre, resinous extractive, gummy extractive, resin, and a little more than one per cent of volatile oil; a peculiar acid also exists in it, which has been named *valerianic acid*. The volatile oil may be obtained from the dry root by the ordinary process of distillation; it is a mixture of a peculiar oil having a camphoraceous odour, and of valerianic acid, but which, according to Gerhardt, does not exist in the oil when first distilled, and even Guibourt, who denies this statement, asserts that valerianic acid does not exist in the fresh root, but is developed in the process of drying. It is to the valerianic acid that the active properties of the plant are due; numerous processes have been lately proposed for obtaining this acid, but the most simple is by decomposing the valerianate of soda or of zinc, by an acid and distilling. Thus prepared it bears much resemblance to the volatile fatty acids; it is an oily liquid, colourless, with a strong, persistent odour of valerian, and an

acid, pungent taste; it is very soluble in water, alcohol, and ether; its density is .944, and its composition, $C^{10} H^{10} O^4$. Valerian imparts its properties to both water and rectified spirit. Magnesia combined with valerian completely removes its odour, which may be again restored by the addition of sulphuric acid. Some of the salts of valerianic acid have been recently much employed in medicine, and having acquired a high character as therapeutic agents have been introduced into the last edition of the Dublin pharmacopœia, and ready processes given for their preparation. *Amylic alcohol* or *Fusel oil* (see *Supplementary agents*), as it is termed by the Dublin College is composed of $C^{10} H^{12} O^2$; by exposure to the air it absorbs oxygen and is converted into valerianic acid; but this change is more rapidly effected by heating it with caustic potash, or by the action of sulphuric acid and bichromate of potash in excess. The latter is the process adopted in the Dublin pharmacopœia, but as the other salts of valerianic acid are most easily prepared by the decomposition of valerianate of soda, the valerianic acid is immediately on its production converted into that salt by the addition of caustic soda. The following is the officinal formula:—*Valerianas Sodæ*, D. (Bichromate of potash, reduced to powder, nine ounces; fusel oil, four fluid ounces; oil of vitriol of commerce, six fluid ounces and a-half; water, half a gallon; solution of caustic soda, one pint, or as much as is sufficient: dilute the oil of vitriol with ten ounces, and dissolve with the aid of heat the bichromate of potash, in the remainder of the water. When both solutions have cooled down to nearly the temperature of the atmosphere, place them in a matrass, and having added the fusel oil, mix well by repeated shaking, until the temperature of the mixture, which first rises to about 150° , has fallen to 80° or 90° . The matrass having been now connected with a condenser, heat is to be applied so as to distil over about half a gallon of liquid. Let this, when exactly saturated with the solution of caustic soda, be separated from a little oil that floats on its surface, and evaporated down until the escape of aqueous vapour having entirely ceased, the residual salt is partially liquefied. The heat should now be withdrawn, and when the valerianate of soda has concretioned, it is, while still warm, to be divided into fragments, and preserved in a well stopped bottle.) The pungent colourless oily liquid that floats on the surface, and which is directed to be separated during the process, is probably *valerianic aldehyde*. The valerianate of soda thus obtained is in white fragments which are soluble in water; they have a feeble odour of valerian, and a mawkish taste.

THERAPEUTICAL EFFECTS.—Valerian is a stimulating antispasmodic, its action being particularly manifested on the cerebral organs; thus, when given in large doses, it produces head-ache, loss of vision and vertigo. It was formerly used as a remedy in rebellious intermittents, and in adynamic fevers, but in the present day it is only employed as an antispasmodic, and opinions differ much with respect to its efficacy as such. My own experience leads me to place much reliance on it in the treatment of aggravated cases of

hysteria, which so often bear a close resemblance to epilepsy, and also in many nervous affections; however, I have always remarked that it soon loses its antispasmodic powers, even though the dose be increased. It is unquestionable that the salts of valerianic acid are more certain in their operation than the preparations of the herb, and will therefore, probably, ere long displace the latter from our *Materia Medica*.

DOSE AND MODE OF ADMINISTRATION.—In powder, ʒss. to ʒj.; of the oil, min. iij. to min. v. Valerianate of soda has been introduced into the Dublin pharmacopœia, it would seem for the preparation of the other officinal valerianates, but it may be given in doses of from gr. ss. to gr. j. or gr. ij.—*Infusum Valerianæ*, D. L. (Valerian root, (bruised, D.), ʒij. (ʒss. L.); boiling (distilled, L.) water, fʒix. (Oj. L.); digest for an hour (half an hour, L.), in a covered vessel, and strain; “The product should measure about fʒviiij.,” D.) Dose, fʒj. to fʒij.—*Tinctura Valerianæ*, D. (Valerian root, bruised, ʒv.; proof spirit, Oij.; macerate for fourteen days, strain, express and filter.)—L. E. (Valerian bruised, ʒv.; proof spirit, Oij.; macerate for fourteen, (seven, E.) days; “or prepare by percolation,” E.) Dose, fʒij. to fʒiv.—*Tinctura Valerianæ Ammoniata*, L. E. (Valerian bruised, ʒv.; (aromatic, L.) spirit of ammonia, Oij.; macerate for fourteen days (seven, E.), and strain; “or prepare by percolation,” E.). Dose, fʒj. to fʒij.

INCOMPATIBLES.—The alkalies; the earthy and metallic oxides; and salts of iron.

VALERIANAS FERRI, D. *Valerianate of Iron.*

PREPARATION.—Valerianate of Soda, five ounces and three drachms; sulphate of iron, four ounces; distilled water, one pint: let the sulphate of iron be converted into a persulphate, as directed in the formula for *ferri peroxydum hydratum*, and by the addition of distilled water, let the solution of the persulphate be augmented to the bulk of eight ounces. Dissolve the valerianate of soda in ten ounces of the water, then mix the two solutions cold, and, having placed the precipitate which forms upon a filter, and washed it with the remainder of the water, let it be dried by placing it for some days rolled up in bibulous paper, on a porous brick. This preparation should be kept in a well stoppered bottle.

PHYSICAL PROPERTIES.—Valerianate of iron, thus prepared, is in the form of a reddish-brown, dull powder, accreted into small porous masses. It is nearly tasteless, but has a very strong, disagreeable, valerianic odour.

CHEMICAL PROPERTIES.—It is composed of an equivalent of protoxide of iron, and one of valerianic acid. It is insoluble in water, but is soluble in alcohol; heated, the valerianic acid is driven off, and peroxide of iron left. Valerianate of iron is not a permanent compound, for if exposed to the air the acid evaporates rapidly, and the salt undergoes decomposition; this effect is produced more rapidly by the addition of any of the stronger acids.

Adulterations.—Owing to the high price at which they were sold,

all the valerianates were much adulterated; but as the process proposed by the Dublin College for this preparation yields them at a cheap rate, this sophistication is no longer to be so much apprehended. The purity of the valerianate of iron may be readily ascertained by its chemical and physical properties as given above.

THERAPEUTICAL EFFECTS.—This preparation has scarcely been employed in medicine hitherto, nor do I think that it is likely to come into general use in consequence of its disagreeable odour and the facility with which it undergoes decomposition. Its effects are similar to those of the valerianate of zinc. (See page 44.)

DOSE AND MODE OF ADMINISTRATION.—In pill made with liquorice powder, and mucilage, half a grain to one grain three times a day.

INCOMPATIBLES.—All acids; and the astringent vegetable extracts.

VALERIANAS QUINÆ, D. *Valerianate of Quina.*

PREPARATION.—Muriate of quina, seven drachms; valerianate of soda, one hundred and twenty-four grains; distilled water, sixteen ounces, dissolve the valerianate of soda in two ounces, and the muriate of quina in the remainder of the water, and, the temperature of each solution being raised to 120° , but not higher, let them be mixed, and let the mixture be set by for twenty-four hours, when the valerianate of quina will have become a mass of silky acicular crystals. Let these be pressed between folds of blotting-paper, and dried without the application of artificial heat. Instead of weighing out seven drachms of muriate of quina, and dissolving it in water, as is above prescribed, we may employ the solution of the muriate prepared from an ounce of the sulphate, as directed in the formula for quinae murias, such solution having been first evaporated to fourteen ounces. It may be observed here, that should it become necessary to evaporate a liquid containing valerianate of quina, care must be taken that its temperature does not rise higher than 120° .

PHYSICAL PROPERTIES.—Valerianate of quina occurs in satiny, crystalline masses of a snowy whiteness; the crystals are octohedrons or hexagonal prisms. Its taste is purely bitter, not disagreeable, and it has a very feeble odour of valerianic acid.

CHEMICAL PROPERTIES.—It is composed of one equivalent of quina, one of acid, and two of water of crystallization. Heated, it loses one equivalent of water, and is converted into a resinous mass no longer soluble in water: the same effect is produced by its solution in water, being kept for some time at a boiling temperature. Valerianate of quina is soluble in water, both proof and rectified spirit, and oils.

Adulterations.—I must refer to the observations made under this head with respect to the valerianate of iron. The best test for these salts is the addition of dilute hydrochloric acid which disengages from them valerianic acid, readily recognizable by its odour.

THERAPEUTICAL EFFECTS.—This is a very excellent preparation, being not only antispasmodic, but antiperiodic, so that it is specially adapted for those neuralgic diseases which assume an intermittent character. It, therefore, fulfils in itself two effects which are so often indicated in this class of diseases, and thus promises to be a

most useful remedy in many neuralgic affections which so frequently baffle the physician's art. As yet, however, our experience of it is but small, although favourable.

DOSE AND MODE OF ADMINISTRATION.—The dose is from gr. ss. to gr. ij.; three times a day. In periodic neuralgia a double dose should be given about an hour before the expected occurrence of the attack. As regards the mode of prescribing it, the remarks on valerianate of zinc are equally applicable to valerianate of quina.

INCOMPATIBLES.—Same as for valerianate of Zinc.

VALERIANAS ZINCI, D. *Valerianate of Zinc.*

PREPARATION.—Valerianate of soda, two ounces and a half; sulphate of zinc, two ounces and seven drachms; distilled water, one quart: dissolve the valerianate of soda in one half, and the sulphate of zinc in the remaining half of the water, and having raised both solutions to 200°, mix them, and skim off the crystals which are produced. Let the solution be now evaporated at a temperature not exceeding 200°, until it is reduced to the bulk of four ounces, removing as before, the crystals from the surface, in proportion as they form; and placing them with those already obtained. The salt thus procured is to be steeped for an hour in as much cold distilled water as is just sufficient to cover it, and then transferred to a paper filter, on which it is to be first drained, and then dried at a heat not exceeding 100°.

PHYSICAL PROPERTIES.—Valerianate of zinc, when pure, occurs in brilliant, pearly, tabular crystals, of a snowy whiteness. It has a somewhat bitter, slightly astringent taste, and a feeble odour of valerian.

CHEMICAL PROPERTIES.—It is composed of one atom of valerianic acid and one of oxide of zinc, is soluble in 50 parts of cold, and 40 of boiling water, in alcohol, ether and the oils. Heated to 122° it softens, at 300° it melts and parts with its water of crystallization and a portion of its acid, and at a higher temperature it burns with a strong empyreumatic odour and is decomposed, a carbonaceous oxide of zinc being left. Valerianate of zinc is very readily decomposed, most acids setting free the valerianic acid and combining with the oxide of zinc. It also undergoes partial decomposition if exposed to the air, or even if kept in badly stopped bottles.

Adulterations.—As met with in the shops, this salt is often of bad quality, in consequence either of having been originally badly prepared or of having been badly preserved. When this is the case, it emits a *strong* odour of valerian, and is not completely soluble in water. Most of the valerianate of zinc met with in commerce lately, especially that prepared in Paris, was nothing more than the butyrate of zinc, to which some oil of valerian had been added; this fraud may be detected by distilling the suspected salt in a glass retort with dilute sulphuric acid and water; on testing the liquid which comes over, with solution of acetate of copper, a bluish-white precipitate will be produced if it be the butyrate, but no change occurs if the salt be the valerianate of zinc. The acetate and other preparations of the metal to which oil of valerian is added, are also

substituted for the valerianate. The substitution may be detected by adding a few drops of dilute hydrochloric acid, by which the valerianic acid will be evolved from the true, but not from a false valerianate.

THERAPEUTICAL EFFECTS.—Valerianate of zinc is a tonic antispasmodic of much power, and as such is peculiarly adapted for the treatment of neuralgic affections, which are so generally dependant on loss of tone in the system. It has been found especially useful in the treatment of facial neuralgia and of vertigo; but I have seen it prove equally beneficial in most of the protean forms of hysterical neuralgia. In short, I look on it as a most valuable addition to the *Materia Medica*, and I fully agree with the observations of Devay, that the chemical combination proves much more beneficial than the oil of valerian and oxide of zinc prescribed together. Latterly, however, the remedy has fallen into some disrepute, owing to the difficulty of obtaining it pure; but this will be remedied by the new and cheap process of the Dublin College.

DOSE AND MODE OF ADMINISTRATION.—The dose of it is from three-fourths of a grain to one grain twice or three times a day; it may be prescribed in the form of pill made with a little mucilage or conserve of red roses, or in solution in orange-flower water, or in distilled water flavoured with syrup of orange-flowers. The compounder must bear in mind that the crystals of valerianate of zinc do not dissolve readily in cold water, floating on the surface in consequence of their lightness; they should, therefore, be first incorporated with a few drops of water in a mortar.

INCOMPATIBLES.—All acids; the soluble carbonates; most metallic salts; and astringent vegetable infusions or decoctions.

CHAPTER IV.

ASTRINGENTS.

(Styptics—Desiccants—Constringents.)

ASTRINGENTS may be defined, substances which produce contraction and condensation, when they come in contact with living matter. The more immediate effect of astringents is to diminish secretion and excretion; ultimately they exert a tonic influence on the human body. Hence they appear to be very nearly allied to *Tonics*; indeed, in many instances, the most powerful tonics will be obtained from the division Astringents. Much difference of opinion exists as to the *modus operandi* of this class of remedial agents. Since the time of Cullen, this has been generally explained by a reference to their action in *tanning*; for the same substances which, by a peculiar chemical action, harden and condense dead animal matter, operate as astringents on the living system. This hypothesis may, to a certain extent, hold good as to the local action of astringents when applied to a morbidly secreting surface, that is to say, they act by constringing the extreme vessels of the part; as a direct evidence of which, their effect on the tongue when introduced into the mouth may be referred to. But it will not account for their power in checking discharges from remote parts, when they are introduced into the system through the digestive organs; in the latter case we must suppose that they produce some peculiar change in the living principle of the structure generally, which is incompatible with excessive secretion or discharge. In cases where the use of astringents is indicated, it will be always necessary, in the first instance, to ascertain the cause by which the morbid discharge is produced, as it often occurs in diametrically opposite states of the system, and therefore very different remedies will in different cases assume the character of an astringent. Thus, where irritability exists, opium, taken from the division Narcotics, will often prove our most useful remedy, given either alone or as an adjuvant to some more immediate astringent. If a state of plethora of the vascular system exist, bleeding and other depletory measures will be indicated; or if the discharge, as in some forms of diarrhœa, be caused by acrid or acid matter, emollients or demulcents and antacids must be employed. The prolonged use of astringents diminishes remarkably cuticular transpiration and the secretions from the intestinal mucous membrane, while they seem to exert little influence

in lessening that from the kidneys; in some cases, even an increased discharge of urine follows their administration, which, however, seems to depend upon their effect on the perspiration. When, therefore, it is requisite that they should be employed for any length of time, their administration should be occasionally intermitted, and means taken to restore a healthy condition of the various secretions and excretions, the balance of which may have been interfered with: of the various remedies which may be had recourse to with this view, I have found none so efficacious as the use of tepid or cold salt water bathing, according to the circumstances of any individual case; indeed, in most instances, bathing may be advantageously combined with the use of astringents.

ACETUM GALLICUM, D. ACETUM, L. ACETUM GALLICUM ET BRITANNICUM, E. *French vinegar*, D. *Vinegar prepared by fermentation*, L. *French or British vinegar*, E.

PREPARATION.—Vinegar is an article of the *Materia Medica* in the three British Pharmacopœias. In France it is prepared from the lighter wines, by exposing them to the air in large wooden vessels placed in a room, the temperature of which is raised to between 68° and 80° F. In Britain, various kinds of malt liquor, cider, raw sugar dissolved in water, &c. are substituted for wine. Of late years, a greatly improved process has been introduced in Germany by which vinegar may be made in 36 hours:—Strong alcohol is diluted with five or six parts of water, and about a thousandth part of yeast, honey, or impure vinegar added to it; the mixture is heated to 75° or 80° and made to trickle slowly through a mass of beechwood shavings, contained in a tall cask, narrowed at the bottom, and pierced with small holes at the top and lower part, to allow a circulation of air; as soon as the mixture is passed through the barrel three or four times, it is converted into vinegar; the change being effected by the alcohol absorbing oxygen from the atmospheric air; the process taking place very rapidly owing to the great surface of the liquid which is exposed.

PHYSICAL PROPERTIES.—Vinegar is of a pale reddish-yellow colour, transparent; with a sharp, peculiar (*acetous*) odour, and an acidulous, refreshing taste. Specific gravity from 1.006 to 1.009. French, or wine vinegar is generally of a deep colour, and has a more fragrant odour than British, or malt vinegar; its density also is greater, being from 1.014 to 1.022.

CHEMICAL PROPERTIES.—It is composed of acetic acid, colouring matter, mucilage and water, and a trace of alcohol; British vinegar contains also sulphuric acid, manufacturers being allowed by law to add a thousandth part by weight of that acid. Wine vinegar may be distinguished from malt vinegar by “ammonia in excess, causing a purplish muddiness, and slowly a purplish precipitate with it.” (*Edinburgh Pharmacopœia*); in addition to the constituents mentioned above, it generally contains some bitartrate and sulphate of potash. The odorous principle of vinegar is conjectured to be acetic ether. Its medicinal virtues depend on the acetic acid it contains.

Adulterations.—Vinegar varies much in strength, and also frequently contains many impurities. The density, as first shown by

Mollerat, does not indicate accurately the quantity of acetic acid present; this is more correctly ascertained by its neutralizing power over crystallized carbonate of soda, 144 grains of salt being equal to 51 grains of real acetic acid. The strongest vinegar prepared, which is termed *proof vinegar*, is estimated to contain five per cent of real acid. In the application of this test, however, care must be taken to allow for any sulphuric acid present. The impurities most commonly met with in vinegar are metallic matter, generally copper or lead; some acrid vegetable substance, as capsicum, grains of paradise, &c.; and sulphuric acid. If the colour be altered on the addition of sulphuretted hydrogen, it contains metallic matter; the presence of an acrid substance may be detected by the taste, the vinegar having been first neutralized with carbonate of soda; the quantity of sulphuric acid contained is indicated by the extent of the precipitate produced with solution of muriate or nitrate of baryta.

THERAPEUTICAL EFFECTS.—Vinegar is an excellent refrigerating astringent, and as such is employed with much benefit in hæmoptysis and in the colliquative sweating and diarrhœa of hectic; taken largely diluted with water, as the usual drink of the patient, it will seldom fail to diminish the excessive discharges. As a local astringent it is used to check hemorrhage from the nose, from the uterus, from hemorrhoidal tumours, and from ulcers; in intestinal hemorrhage, enemata containing vinegar have been employed with much advantage, particularly when the bleeding proceeds from the large intestines. In relaxation of the uvula and tonsils, it forms an excellent addition to astringent gargles; and in chronic ophthalmia, diluted with water, it is beneficially employed as a collyrium. Finally, in poisoning with the alkalies, or alkaline carbonates, vinegar is one of the best antidotes that can be employed; but in poisoning with most other substances, for which at one time it was very generally used, its administration is in general productive of mischief. (See, *Refrigerants*.)

DOSE AND MODE OF ADMINISTRATION.—f3j. to f3ss. For an enema, f3j. to f3ij. diluted with f3ij. to f3iv. of water. As a drink in hectic, f3ij. diluted with Oiss. of distilled water may be taken in the course of the day.—*Acidum Aceticum dilutum*, D. *Acetum distillatum*, L. E.—("Take of acetic acid of commerce (specific gravity, 1·044,) Oj.; distilled water, Ovij.; mix. The specific gravity of this acid is 1·006," D.—"Take of vinegar, cong. j.; let the vinegar distil in a sand bath, from a glass retort into a glass receiver. Keep the Ovij. first distilled for use;" L.—"Take of vinegar, (French by preference), 8 parts; distil over with a gentle heat, 7 parts; dilute the product, if necessary, with distilled water, till the density is 1·005;" E.). This preparation is preferred to common vinegar, in consequence of its more equable strength, for external use in lotions, eye-washes, &c. The Dublin College prepares it most simply by diluting acetic acid. For internal use the French vinegar should be preferred.—*Oxymel*, D. L. ("Clarified honey, *by weight*, lbj.; acetic acid of commerce (specific gravity 1·044,) f3ij.; mix the acid with the honey previously heated," D.—"Honey (clarified), lbx.; acetic acid, Oiss.;

mix the acid with the honey made hot;" L.) An excellent addition to gargles.—*Antihæctic mixture*, AUTHOR—(Distilled vinegar, f3ij.; laurel water, f3ij.; simple syrup, f3vj.; distilled water, f3v.; mix.) Dose, f3j. to f3ij. every third or fourth hour. An excellent mixture in the profuse sweating of hectic.

ACIDUM GALLICUM, D.—*Gallic Acid*. A peculiar acid developed in nutgalls, by the decomposition of tannin, under the influence of air and moisture.

PREPARATION.—Galls in coarse powder, one pound; distilled water, as much as may be necessary: having placed the galls in a porcelain dish, pour on as much water as will convert them into a thick paste, and keep them in this moistened condition for six weeks, at a temperature of between 60° and 70°, adding water from time to time, so as to supply what is lost by evaporation. Let the residue be boiled for twenty minutes, with forty-five ounces of water, and then placed on a calico filter. The filtered solution, on cooling, will afford a copious precipitate. Let this be drained on a calico filter, then subjected to strong expression, after having been first enveloped in blotting paper, and again dissolved in ten ounces of boiling water. When, upon ceasing to apply heat, the solution has cooled down to 80°, pour it off from the crystals which have formed, and, having washed these with three ounces of ice-cold water, dry them, first on blotting paper, and finally by a steam or water heat. By boiling the undissolved portion of the galls with forty-five additional ounces of water, filtering into a capsule containing the liquor decanted from the crystals formed in the preceding process, evaporating down to the bulk of ten ounces, and cooling to 80°, an additional quantity of the crystallized acid will be obtained. Or,—Powdered galls, one pound; oil of vitriol of commerce, twenty-six fluid ounces; water, five pints and fourteen ounces; steep the galls for twenty-four hours in one pint of the water, then transfer them to a glass or porcelain percolator, and pour on a pint and a half of the water in successive portions. Dilute five ounces of the oil of vitriol with an equal bulk of water, and, when the mixture has cooled, add it to the infusion obtained by percolation, stirring well, so as to bring them into perfect contact. Let the viscid precipitate which forms be separated by a filter, and to the solution which passes through add five ounces more of the oil of vitriol, which will yield an additional precipitate. This being added to that previously obtained, let both be enveloped in calico, and subjected to powerful pressure. Dissolve the residue in the rest of the oil of vitriol, this latter being first diluted with what remains of the water; boil the solution for twenty minutes, then allow it to cool, and set it by for a week. Let the deposit which has formed at the end of this period be pressed, dried, and then dissolved in three times its weight of boiling water, clearing the solution, if necessary, by filtration, and, when it has cooled down to 80°, decant the liquid from the crystalline sediment which has formed, and wash the latter with three ounces of ice-cold water. Finally, let it be transferred to blotting-paper, and when deprived by this of adhering liquid, let it be dried perfectly, at a temperature not exceeding 212°. The gallic acid obtained by either of the preceding processes may be rendered nearly white, by dissolving it in twenty times its weight of boiling distilled water, and causing the solution to traverse a stratum of prepared animal charcoal spread upon a calico filter. When the liquid passes through colourless it should be evaporated to one-sixth of its volume, and then suffered to cool in order to the separation of the crystallized acid.

PHYSICAL PROPERTIES.—Gallic acid crystallizes in brilliant, satiny, yellowish-white needles, which are unalterable in the air. It is inodorous, but has a slightly acidulous styptic taste, leaving a sweetish impression on the mouth.

CHEMICAL PROPERTIES.—Its composition in the crystalline state is $C^7H^6O^5 + HO$. It is very sparingly soluble in cold water or in ether, requires but 3 parts of boiling water for its solution, and is

also very soluble in alcohol. It reddens litmus paper, and forms bibasic salts with oxides. When pure it does not precipitate gelatine, by which characteristic it may be distinguished from tannic acid, but like the latter, it gives a bluish-black precipitate with the sesqui-salts of iron. According to Buchner 7·5 per cent of gallic acid is procured from galls, and from 50 to 60 per cent from tannin.

THERAPEUTICAL EFFECTS.—Gallic acid is a powerful astringent, its effects being particularly manifested on the urinary organs, which is directly proved by the fact of its presence in the urine of those who have taken it, being readily manifested by the addition of a sesqui-salt of iron to that secretion, a few hours after the acid has been swallowed. It is, therefore, a remedy of great value in all forms of hemorrhage from the kidneys or bladder, provided no inflammatory symptoms are present, and especially in those forms which are the result of injury. It is also one of our best astringents in hemorrhage from the stomach and bowels, on its efficacy in which I have published some observations in the *Dublin Quarterly Journal of Medical Science*.* In hemorrhage from the uterus, also, my experience of it is corroborative of the published observations of Professor Simpson of Edinburgh, and Dr. Locock of London. In desquamative nephritis, gallic acid is often productive of decided benefit, checking for a time the progress of the disease, the increased secretion of urine and the quantity of albumen in it being sensibly diminished during its administration.

DOSE AND MODE OF ADMINISTRATION.—Gr. iij. to gr. v. two or three times a day, in the form of pill, or suspended in water by means of mucilage; in urgent cases this quantity may be given every hour or every second hour.

INCOMPATIBLES.—The sesqui-salts of iron.

ACIDUM SULPHURICUM VENALE, D. ACIDUM SULPHURICUM, L. E.
Commercial sulphuric acid; (Specific gravity, 1·845; L. 1·840; E.) Oil of Vitriol.

PREPARATION.—The method of preparing sulphuric acid is described in all elementary works on chemistry. The Dublin and Edinburgh Colleges have given formulæ for purifying the acid, in order to obtain it free from the impurities usually met with in the commercial sort; it is then termed, *Acidum Sulphuricum purum*:—"Oil of vitriol of commerce, any convenient quantity: introduce it into a small plain retort, containing a few slips of platinum foil, and passing the beak of the retort into a Florence flask, which is to be used as a receiver, with the aid of a small charcoal fire or gas-lamp, distil over one-tenth of the acid. This being rejected, and a fresh receiver of the same kind connected with the retort, let the distillation be resumed, and continued until no more than about an ounce of liquid remains behind. The distilled product should now be transferred to, and preserved in a well-stopped bottle. The specific gravity of this acid is 1·846." **D.**—"If commercial sulphuric acid contain nitrous acid, heat f3viij. of it, with between gr. x. and gr. xv. of sugar, at a tem-

* New Series, Vol. ix. p. 349.

perature not quite sufficient to boil the acid, until the dark colour at first occasioned shall nearly, or altogether disappear. This process removes nitrous acid. Other impurities may be removed by distillation, which on the small scale is easily managed by boiling the acid with a few platinum chips, in a glass retort, by means of a sand-bath or gas-flame—rejecting the first half-ounce. The density of it is 1.845." E.

PHYSICAL PROPERTIES.—It is a heavy, oily-looking liquid, transparent, colourless when pure (the commercial acid generally has a brownish yellow tinge,) inodorous, with an intensely acid, burning taste; when much diluted with water, the taste is merely styptic.

CHEMICAL PROPERTIES.—It is composed of one equivalent of sulphuric acid (SO^3), and one of water; it boils at 620° , and freezes at -29° . It has a great affinity for water, which it absorbs from the atmosphere; during its combination with water, great heat is evolved, a mixture of 4 parts by weight of strong acid with one of water raises the temperature to near 300° . Sulphuric acid is one of the most powerful acids of chemistry, supplanting nearly all others from their combinations. It chars and destroys most animal and vegetable substances. Its best characteristic is the heavy white precipitate, insoluble in either acids or alkalis, which it produces with solution of the chloride of barium or nitrate of baryta.

Adulterations.—If the acid contain water, it will not be of the prescribed density. The impurities usually present in commercial sulphuric acid are sulphate of lead, nitrous acid, and arsenic. Dilution with distilled water precipitates the white sulphate of lead, if it be present; the smallest trace of nitrous acid may be detected, by gently pouring over the specimen to be examined a solution of the protosulphate of iron; if nitrous acid be contained in it, a deep red colour will be produced at the line of contact. The arsenic adulteration can be easily detected by adding the diluted acid to pure zinc in *Marsh's apparatus*, and proceeding as directed for the detection of that substance, (See, *Arsenic*); or by passing a stream of sulphuretted-hydrogen through the dilute acid, when a yellow sulphuret of arsenic will be formed.

THERAPEUTICAL EFFECTS.—Sulphuric acid is a most powerful corrosive poison, destroying the animal tissues wherever it comes in contact with them. Properly diluted it is an excellent tonic astringent, and is employed with very beneficial results in all forms of passive hemorrhages, and to check excessive discharges when they are dependant on debility:—Thus, it is used with much advantage in hemoptysis, in epistaxis, in slight but protracted bleedings from the uterus, the stomach, or intestines, and in the colliquative sweating and diarrhœa of hectic. In calculous affections, with phosphatic deposits, dilute sulphuric acid is administered with much advantage; and in painters' colic it is very generally employed with benefit, both as a prophylactic of the disease, and as a remedy when the attack is present. As a topical astringent, sulphuric acid, largely diluted, was at one time much used to foul and indolent ulcerations of the mouth and fauces, but in consequence of its

liability to injure the teeth, it is scarcely ever employed in such cases at present. The internal use of this acid, if continued for any length of time, is apt to derange the digestive functions, causing cardialgia, griping pains and emaciation.

DOSE AND MODE OF ADMINISTRATION.—In prescribing any of the dilute mineral acids, it is generally recommended that the patient be directed to suck them through a quill, in order to prevent them from producing any injurious effect on the teeth; but Mr. L'Estrange of this city has suggested to me a much more efficacious plan, namely, that a small bit of butter should be rubbed over the teeth, just before the dose is to be taken. This method is of course equally applicable, where other medicines, as many preparations of iron, iodine, &c. which injure the teeth, are administered. *Acidum sulphuricum dilutum*, D. L. E. (Sulphuric acid (pure, D.), f3j., (f3iiss., L.); distilled water, f3xiiij. (f3xivss., L.); add the acid to the water gradually, and mix. Specific gravity, 1·084, D., 1·090, E.). Dose, min. x. to min. xxx. in f3j. to f3ij. of some mild liquid; it is usually given in the acid infusion of roses. It must be remembered that as the pure acid of the Dublin College is stronger than that of Edinburgh, the dilute acid is also stronger, as indicated by its density; the specific gravity of the London preparation is, according to Mr. R. Phillips, 1·110, and is therefore more concentrated than that of either of the other colleges.—*Acidum sulphuricum aromaticum*, D. E. (Rectified spirit, Oiss.; pure (commercial, E.) sulphuric acid, f3iiiiss.; ginger bruised, 3j.; cinnamon bruised, 3iiss:—"Upon the spirit, placed in a stoppered bottle, pour the acid gradually, and shake so as to produce a uniform mixture. Then add the cinnamon and ginger, and macerate for a week, with occasional agitation. Lastly, filter through paper, and preserve in a well-stopped bottle. The specific gravity of this preparation is ·974." D. "Add the acid gradually to the spirit, let the mixture digest at a very gentle heat for three days, in a close vessel. Add the powders, digest for six days more, and then strain: or the mixed powders may be moistened with a little of the acid spirit, and after 12 hours the powders may be exhausted by percolation with the rest of the spirit," E.) This preparation is used in the same cases as the dilute sulphuric acid, for which it forms an agreeable substitute. Dose, min. xx. to min. xxx. in a wine-glass of water.

INCOMPATIBLES.—The alkalies, and their carbonates; most metals, and their oxides; some of the earths, and their carbonates; acetate of lead; chloride of calcium; chloride of barium; nitrates; alcohol, and consequently all tinctures; organic substances; essential oils; and the vegetable astringent infusions or decoctions.

In poisoning with this acid, the best antidotes are the alkaline bicarbonates, or carbonate of magnesia. Chalk and magnesia, though generally recommended, should not be employed, as with the former sulphate of lime is formed, and the combination of sulphuric acid with the latter produces a considerable degree of heat. External parts burned with it should be washed with soap and water.

ACIDUM TANNICUM, D.—*Tannic acid*; *Tannin*. A peculiar principle on which the astringent property of vegetable substances chiefly depends.

PREPARATION.—Galls, in tolerably fine powder, ℥viij.; sulphuric ether, Oij.; distilled water, ℥v.: incorporate the water and ether by agitation, and pour the resulting solution in successive portions upon the galls, previously introduced into a glass or porcelain percolator. The liquid which accumulates in the lower bottle will consist of two distinct strata, the heavier of which is to be separated, and evaporated to dryness, finally applying an oven heat, which, however, should not exceed 212° . From the lighter liquid the ether may be recovered by distilling it by means of a water bath, and with the aid of a Liebig's condenser.

PHYSICAL PROPERTIES.—Thus obtained, tannic acid is a yellowish-white, uncrystallizable solid, shining and pulverulent; inodorous; taste purely astringent, void of all bitterness.

CHEMICAL PROPERTIES.—Its composition is $C^{18}H^5O^9 + 3HO$. Exposed to the air, it absorbs oxygen, and is almost entirely converted into *gallic acid*. It is very soluble in water, moderately so in alcohol or proof spirit, and but very sparingly soluble in ether. It is insoluble in the fixed and volatile oils. Its solution reddens litmus paper. Its most remarkable property is, that it does not affect the protosalts of iron, but gives a dark blue precipitate with the salts of the peroxide of that metal.

THERAPEUTICAL EFFECTS.—Tannic acid is the most powerful of all vegetable astringents, and has been employed on the continent with much success in the treatment of the various forms of atonic hemorrhage, and in chronic mucous discharges; it has been found peculiarly efficacious in menorrhagia, and in the colliquative sweating and diarrhoea of hectic. Tannin forms insoluble compounds with the gastric juice and other matters found in the stomach, and should therefore be used with caution in dyspeptic habits. A lotion of 4 parts of tannin, dissolved in 30 parts of water, is an excellent application to open cancer, more especially in cases attended with hemorrhage.

DOSE AND MODE OF ADMINISTRATION.—Gr. ss. to gr. j. or ij., in the form of pill, or dissolved in water. It has also been employed in the form of gargle, injection or lotion, in the proportion of gr. v. to gr. viij. of tannin to f℥j. of water.

INCOMPATIBLES.—The mineral acids; the alkalies, and their carbonates; lime water; acetate of lead; nitrate of silver; the persalts of iron; tartar emetic; the vegetable alkaloids; gelatin; and emulsions.

ALUMEN, D. E. ALUMINÆ ET POTASSÆ SULPHAS, D. L. *Alum*; *Sulphate of alumina and potash*.

PHYSICAL PROPERTIES.—As met with in the shops, alum is in transparent, colourless, crystalline masses, void of odour, having a sweetish astringent taste. Specific gravity, 1.700. By solution

and crystallization it may readily be obtained in regular octahedres.

CHEMICAL PROPERTIES.—It is composed of one equivalent of sulphate of potash, one of tersulphate of alumina, and 24 of water ($\text{KO}, \text{SO}^3 + \text{Al}^2 \text{O}^3, 3 \text{SO}^3 + 24 \text{HO}$). The crystals effloresce slightly in the air; heated they fuse in their water of crystallization, all of which they part with, and are converted into a light porous mass, known as *dried* or *burned alum*. Alum dissolves in 18·36 parts of cold water, and in 0·75 parts of boiling water: the solution is decidedly acid. By a red heat alum is deprived of most of its sulphuric acid, and converted into a mixture of sulphate of potash and pure alumina.

THERAPEUTICAL EFFECTS.—Alum is a powerful astringent, and as such is employed with benefit in the treatment of many diseases, both as a general and topical remedy. Administered internally, it is found useful in the treatment of chronic diarrhœa and dysentery, in atonic mucous discharges, in passive hemorrhages, in the colliquative sweating of hectic, &c. In *pyrosis*, given in large doses frequently repeated, it has proved very successful in the hands of many practitioners; and it has, also, when given in full doses combined with opium, been found to be an excellent remedy in the treatment of *colica pictorum*. As a topical astringent, it is employed to arrest bleeding from minute vessels, as in epistaxis, in menorrhagia, in hemorrhage from leech bites, &c. *Dried alum*, in fine powder, is an excellent application in the early stages of the inflammatory sore throat of scarlatina, measles and small-pox, and in diphtheritis; it is best applied by insufflation, that is, by placing a small portion of it in an open glass tube, and blowing it into the throat. Dissolved in water, alum is also used with much advantage as a gargle in relaxation of the uvula and tonsils, in chronic ulcerations of the mouth and fauces, and in excessive salivation; as a collyrium, in chronic ophthalmia; and as an injection in gleet and fluor albus.

DOSE AND MODE OF ADMINISTRATION.—*Internally*, gr. x. to ʒss. in powder, or made into pill with extract of liquorice, or it may be given in solution in some aromatic water.—*Pulvis aluminis compositus*, E. (Alum, ʒiv.; kino, ʒi; mix them and reduce them to fine powder). A useful astringent in chronic diarrhœa, and in passive hemorrhages from the stomach and bowels; Dose, gr. xij. to ʒij. It has also been applied externally to flabby ill-conditioned ulcers.—*Alum whey*, (Alum, powdered, gr. x.; new milk, fʒij.; boil together for ten minutes, and strain to separate the curd). Sufficient for one dose.—*Externally*, gr. xxx. to ʒij. dissolved in Oj. of water.—*Cataplasma aluminis*, (Agitate together, so as to form a coagulum, the whites of two eggs and a drachm of alum). This preparation has been omitted from the last edition of the Dublin Pharmacopœia; it is highly esteemed by many practitioners for the treatment of chronic or purulent ophthalmia, applied to the eye between two folds of linen.—*Alumen siccum*, D.—*exsiccum*, L. E. (“Take of alum

any convenient quantity: liquefy it in a porcelain capsule, over a gas-lamp or open fire, and continue the heat until vapour ceases to be disengaged. Let the residue be then reduced to a fine powder, and preserved in a well-stopped bottle," D.—"Take any convenient quantity of alum; liquefy it in an earthen (or iron, E.) vessel over the fire, increase the heat till the ebullition has ceased; then reduce it to powder," L. E.) For external use only.—*Liquor aluminis compositus*, L. (Alum; and sulphate of zinc, of each, ʒj.; boiling water, Oijj.; dissolve the salts together in the water, and strain). An excellent astringent lotion, collyrium, or injection.

INCOMPATIBLES.—Alkalies, and their carbonates; lime and magnesia, and their carbonates; tartrate of potash; acetate of lead; salts of mercury; vegetable extractive matter; and substances containing tannin.

CATECHU, D. L. E. *Catechu*; *Extract of the wood of Acacia Catechu*, D. L.—*The leaves of Uncaria Gambir*, (Roxburgh Fl. Indica), furnish the variety of *Catechu* known in commerce as *Terra Japonica*; D. *Extract of the wood of Acacia Catechu*,—of the kernels of *Areca Catechu*,—and of the leaves of *Uncaria Gambir*,—probably too from other plants, E. *Acacia Catechu* is a native of several parts of the East Indies; it belongs to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Polygamia Monœcia*. *Areca Catechu* inhabits most of the Indian continent and islands; it belongs to the Natural family *Palmaceæ*, and to the Linnæan class and order *Monœcia Hexandria*. *Uncaria Gambir* is a native of many of the islands of the Indian Archipelago; it is placed in the Natural family *Cinchonaceæ*, and in the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—*Acacia Catechu*; Stem, 15-20 feet high, with a brown, scabrous bark, and a hard, heavy wood, dark-red in the centre; Flowers, numerous, pale-yellow; Legumes, 8 seeded. *Areca Catechu*; a beautiful palm, between 40 and 50 feet high; Leaves, 15 feet in length, crowded at the extremity of the stem; Flowers, in numerous clusters, appearing from among the leaves; Fruit, a handsome orange-coloured ovoid drupe. *Uncaria Gambir*; a stout scandent shrub; Leaves, ovato-lanceolate; Flowers, green and pink, in loose heads, on opposite axillary peduncles.

PREPARATION.—From the *Acacia*, catechu is obtained by boiling the red heart-wood cut into chips for some hours in water, until the decoction is sufficiently concentrated to become on cooling a tough extract; it is then divided into small masses, and dried slowly in the shade.—In the interior of the fruit of the *Catechu palm* is contained a roundish conical nut, marbled internally brown, with whitish veins, commonly known by the name of *belle nut*, and which, with lime and the leaves of the *Piper belle*, constitutes the celebrated masticatory of the East, called *Belle*. These nuts contain a large quantity of tannin, and a decoction of them concentrated and dried forms some of the inferior catechus of commerce.—The leaves of the *Uncaria Gambir* are boiled in water immediately after they are pulled from the tree, the decoction concentrated, and run into square or parallelopiped moulds, to constitute the catechu in cubes of commerce.

PHYSICAL PROPERTIES.—A great many varieties of catechu occur

in commerce, but we shall confine our attention to the two sorts officinal in the Dublin Pharmacopœia, and which are also those most usually met with in druggists' shops, the others being chiefly employed for tanning. 1st.—*Brown Catechu in irregular masses*; this is the produce of the *Acacia Catechu*, it occurs in irregular-shaped, roundish masses, generally covered with rice husks, weighing from three or four ounces to a pound or more each, of a chocolate-brown colour, very friable, with an astringent bitter taste. 2nd.—*Catechu in cubes* (*Gambeer*; *Terra Japonica*; *Cubical resinous catechu*); This variety is obtained from the *Uncaria Gambir*; it occurs in cubes, whose faces are about an inch square; it is of a yellowish-brown colour, with a paler, dull, earthy fracture; is void of odour, but has a very astringent taste, becoming feebly sweetish.

CHEMICAL PROPERTIES.—The different varieties of catechu consist principally of *tannin*, and of a peculiar acid, which has been named *catechuic acid*. Their astringency depends on the tannin, of which the finer qualities contain 55 per cent, while some inferior specimens do not yield more than 28 per cent. Catechu does not dissolve completely in boiling water, but when of good quality is almost entirely soluble in alcohol. The watery infusion is of a dark reddish-brown colour, and reddens litmus paper faintly; it gives a blackish precipitate with sulphate of iron.

Adulterations.—The varieties of catechu are so numerous and so different in quality, and many of them are so very impure, that the only satisfactory test of their relative value is to ascertain the quantity of tannin which is contained in them. This may be readily done, by acting on a given weight with ether, evaporating the ethereal solution to dryness, treating the extract thus obtained with cold water, and again evaporating; when the proportion soluble in both ether and water should amount at least to from 38 to 40 per cent of the specimen.

THERAPEUTICAL EFFECTS.—Catechu is a simple, but very efficacious astringent, and is consequently in general use. It may be administered in all cases of increased mucous discharges, where there is no inflammation present:—Thus it is employed with benefit in chronic cystirrhœa, in leucorrhœa, in gleet, in chronic catarrh, and in old standing cases of diarrhœa and dysentery, in which it is usually given in combination with opiates. It is also an excellent remedy in passive hemorrhages from the intestines, or uterus; as a topical astringent it is one of the most useful applications in relaxation of the uvula and tonsils, in slight ulcerations of the mouth, and in chaps or excoriations of the nipple in nurses; for the latter purpose the tincture should be applied with a camel's-hair-pencil repeatedly in the course of the day. Public speakers and singers employ catechu lozenges with much benefit as a preventive of hoarseness, and as a remedy for it when it exists.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒj. in powder with sugar, or made into a bolus with honey or treacle.—*Pulvis Catechu compositus*, D. (Take of catechu; kino, of each, two

ounces; cinnamon; nutmeg, of each, half an ounce. Reduce each to powder, mix and pass through a fine sieve. When prepared, the powder should be kept in well-stopped bottles). Astringent and aromatic. Dose, ʒss. to ʒj. or ʒij.—*Infusum Catechu*, E. *Infusum Catechu compositum*, D. L. (“Catechu in coarse powder, ʒiij. (ʒvj., L.); cinnamon bark bruised, ʒss. (ʒj. L.); boiling water (distilled, L.), fʒix. (Oj. L.); infuse (macerate L.), for half an hour (an hour, L.) in a covered vessel, and strain, (the product should measure about fʒviiij., D.),” D. L. “Catechu powdered, ʒvj.; cinnamon powdered, ʒj.; syrup, fʒiij.; boiling water, fʒxviij.; infuse the catechu and cinnamon with the water for two hours, strain through linen or calico, and add the syrup,” E.) Dose, fʒj. to fʒij. two or three times a day, or the same quantity may be added to an astringent enema.—*Tinctura Catechu*, D. L. E. (Catechu, in coarse powder, (in moderately fine powder, E.), ʒiv. (ʒiiiss., L. E.); cinnamon, bruised, ʒj. (ʒiiss., L. E.); proof spirit, Oij.; macerate (digest, E.) for 14 (7 E.) days, strain, express (strongly, E.), and filter. “This tincture may also be prepared by the process of percolation, the mixed powders being put into the percolator without being previously moistened with the spirit,” E.); Dose, fʒj. to fʒij.; usually employed as an adjunct to astringent mixtures in diarrhœa.—*Confectio Catechu compositum*, D. (Take of compound powder of catechu, five ounces; simple syrup, five fluid ounces. Add the syrup gradually to the powder, and mix them well together). This preparation is introduced in place of the compound electuary of catechu of the former pharmacopœia, from which it differs especially in that it contains no opium. Dose, from ʒj. to ʒss. It may be added to astringent mixtures or to chalk mixture.—*Electuarium Catechu*, E. (Catechu, ʒiv.; cinnamon, ʒj., kino, ʒiv.; nutmeg, ʒj.; opium, diffused in a little sherry, ʒiiss.; syrup of ginger, reduced to the consistence of honey, Oiss.; pulverise the solids; mix the opium and syrup; add the powder, and beat them thoroughly into a uniform mass). A useful astringent in chronic diarrhœa and dysentery; Dose, ʒj to ʒij. One ounce contains gr. ij¼ of opium.—*Catechu lozenges*, P. (Catechu, 1 part; sugar, 4 parts; mucilage of gum-tragacanth sufficient to form into a proper mass, divide into lozenges of gr. x. each).

INCOMPATIBLES.—The alkalies; lime water, salts of iron, and of lead; gelatine; and all vegetable substances whose active principle is an alkaloid, as an insoluble tannate of the alkaloid will be formed. Christison, however, states, and I fully agree with him, that it is probable the alkaloidal tannates are sufficiently soluble in the acids of the gastric juice.

CREASOTUM, D. E. CREASOTON, L.—*Creasote*.—*An oxyhydrocarburet, prepared from pyroxylic oil*, (Lond.)—Creasote exists in

pyroligneous acid, in wood smoke, and in wood tar; from the latter of which it is usually prepared. Different processes are followed by different manufacturers for the preparation of creasote; and as they are very complicated, and can only be successfully executed on the large scale, I must refer to some of the modern works on chemistry for an account of them.

PHYSICAL PROPERTIES.—Pure creasote is a colourless, transparent, oily-looking liquid, having a smoky odour, and a bitter, acrid, somewhat caustic taste. Its specific gravity is 1·066, D. E.

CHEMICAL PROPERTIES.—It is a compound of $C^{14}H^9O^2$ (Ettling). It boils at a temperature of $397\cdot4^\circ$; and is not congealed at $-16\cdot6^\circ$; at a temperature a little above its boiling point it is decomposed; it is inflammable, and burns with a very sooty flame. Creasote forms two different compounds with cold water; one, a solution of 1·25 parts of creasote in 100 parts of water; the other, a solution of 10 parts of water in 100 of creasote. It mixes with acetic acid in all proportions, as also with alcohol and ether. It coagulates albumen; dissolves most resins; and has a powerful preservative property with respect to animal substances, whence its name is derived, (*κρεας σωζω.*) It is neutral.

Adulterations.—Creasote, from being badly prepared, frequently contains a number of peculiar principles which exist in tar, and it is commonly adulterated with the fixed and volatile oils; its purity may be known by its being colourless, by its complete solubility in acetic acid, by its density not being too high, and “by its leaving no translucent stain on white filtering paper, when dropped on it, and exposed to a temperature of about 212° for ten minutes.” *Edinburgh Pharmacopœia.*

THERAPEUTICAL EFFECTS.—As an astringent creasote is chiefly employed externally, but it is also used as an internal remedy with much benefit in some diseases. Its principal uses as such are, as a styptic to arrest hemorrhage, which it does very effectually when the bleeding proceeds from small vessels, as in some forms of hematemesis and of bleeding from the intestines, in cuts or abrasions, from leech bites, or from ulcerated surfaces; in mucous diarrhœa; as an application to indolent ulcers, especially when accompanied by a sanious discharge, to chronic venereal or phagedenic ulceration, to ulcerated chilblains, in chronic skin diseases, and as an injection in leucorrhœa. It also forms an excellent gargle in obstinate salivation, in the proportion of a drachm and a-half to a pint of liquid. (See also, *Sedatives*).

DOSE AND MODE OF ADMINISTRATION.—Min. j. to min. ij. gradually increased to min. v., dissolved in at least an ounce or an ounce and a-half of water: the dose should be repeated at short intervals. In the external application of creasote in the form of wash, its little solubility in water should be remembered, for if any excess be present, it will float on the surface, and being thus applied directly, will produce an effect very different from what was

intended. For a wash, min. ij. to min. vj. may be dissolved in f3j. of water; or the following ointment may be employed.—*Unguentum Creasoti*, D. L. E. (“Take of creasote, one fluid drachm; ointment of white wax, seven drachms: To the ointment, liquefied by a moderate heat, add the creasote, and stir constantly until the mixture concretes, D.” “Creasote, f3ss. (f3j., E.); axunge, 3j. (3ij. E.) “rub and mix them,” L. “Melt the axunge, add the creasote, stir them briskly, and continue to do so as the mixture concretes on cooling,” E.).

CRETA, *Chalk*, (described in the division *Antacids*), is employed as an astringent in the various forms of diarrhœa; its beneficial effects as such depend principally upon its antacid properties, (see p. 8). Chalk mixture is very generally used as a vehicle for more active astringents. The following preparation is admirably adapted for the simpler forms of diarrhœa, when unattended with inflammation:—*Pulvis Cretæ Opiatus*, D. E. *Pulvis Cretæ compositus cum Opio*, L. (“Take of compound powder of chalk, four ounces and seven drachms; opium, in fine powder, one drachm: Mix them intimately, and pass through a fine sieve,” D. “Compound chalk powder, 3viss. (3vj. E.); hard opium, powdered, 3iv.; mix them,” L. E.) Dose, for adults, gr. xx. to gr. xl.; for children, gr. ij. to gr. x. Forty grains (D. L.), thirty-seven (E.), of this powder contain one grain of opium.

CUPRI SULPHAS, D. L. E. *Sulphate of copper. Blue vitriol.*

PREPARATION.—It is an article of the *Materia Medica* in the three British Pharmacopœias. On the large scale it is usually prepared by roasting copper pyrites, *sulphuret of copper*, exposing it to the air and to moisture until it is oxidated, dissolving out the sulphate thus formed, evaporating and crystallizing.

PHYSICAL PROPERTIES.—This salt usually occurs in fragments of large crystals, of the oblique rhombic prism series, semitransparent; of a beautiful blue colour; without odour, but having a styptic, metallic taste. Specific gravity, 2.2.

CHEMICAL PROPERTIES.—The crystals are composed of 1 equivalent of protoxide of copper, 1 of sulphuric acid, and 5 of water (CuO , SO^3 , $\text{HO} + 4 \text{HO}$). They effloresce slightly in dry air; at a temperature of 212° they part with 4 equivalents of water; at 400° they become anhydrous and white; and at a red heat they fuse and lose part of their acid. Sulphate of copper is soluble in 4 parts of cold, and in 2 of boiling water; it is insoluble in alcohol. It has an acid reaction.

Adulterations.—Sulphate of copper is very often adulterated with

sulphate of iron; I have seen some specimens which contained nearly 50 per cent of that salt. In the crystalline state, the fraud may be readily detected with the naked eye. The best chemical test is the addition of ammonia in excess to a solution of the suspected salt, which has been previously boiled with a little nitric acid; should any iron be present, the precipitate at first thrown down will not be completely redissolved.

THERAPEUTICAL EFFECTS.—Sulphate of copper in large doses, if it be not rejected by vomiting, is a powerful irritant poison, producing inflammation of the parts with which it comes in contact, and acting remotely on the nervous system, causing death with coma and convulsions. In small but repeated doses it operates as a tonic and astringent; with the latter intention, it is only employed in chronic diarrhœa and dysentery, in which it will often succeed in checking the discharges, when vegetable astringents completely fail. Externally a solution of sulphate of copper is used with benefit as a stimulating astringent to indolent and ill-conditioned ulcers attended with excessive discharge, as a collyrium in chronic ophthalmia, and as an injection in chronic mucous discharges from the urethra or vagina. In the early stages of gonorrhœa, if the inflammation does not run very high, a weak solution, gr. j. to f̄j. of water, injected three or four times a day, will often succeed in checking the disease. (See, also, *Caustics*, *Emetics*, and *Tonics*).

DOSE AND MODE OF ADMINISTRATION.—Gr. ss. to gr. ij. or gr. iij. made into pill with conserve of roses. For a lotion, gr. ij. to gr̄. x. in f̄j. of water. For an injection, gr. j. to gr. iv. in f̄j. of water.

INCOMPATIBLES.—The alkalies and their carbonates; lime water; acetate of lead; nitrate of silver; corrosive sublimate; all the salts of iron except the sulphate, and most astringent vegetables.

In poisoning with this salt, the best antidote is albumen, as the white of egg; and in its absence, wheaten flour. Sugar has also been found beneficial, and iron filings have been recently proposed, so as to precipitate the copper in the metallic state.

ERGOTIN. *Ergotin*, the alcoholic extract obtained from Ergot of Rye. The mode of preparation, &c., of this article will be described under the article *Ergota* in the chapter on Emmenagogues.

M. Bonjean has experimented extensively on the hemostatic powers of *ergotin*; and there can be no doubt, from the result of his observations that, when applied locally, it is a powerful agent in checking hemorrhage. He has found it especially useful when the bleeding proceeds from incised wounds, or from many small vessels, and in all cases when compression cannot be had recourse to, from any cause. His method of employing it is as follows:—The *ergotin* is dissolved in five or six parts of water in ordinary cases: in three or four parts only, where the hemorrhage is severe; pieces of lint,

saturated in this solution, are applied to the part previously well dried, and pressure maintained with the hand until the blood ceases to flow. Should the bleeding continue, the lint is kept constantly wet with the solution; the pressure should be firm, but not sufficient to interrupt the circulation. The lint should not be removed for three or four days. M. Bonjean has also administered ergotin internally in hemorrhages in doses of from five to ten grains; but its effect is not so decided as when it is employed locally.

FERRI PERNITRATIS LIQUOR, D.—*Solution of the Pernitrate of iron; Persesquinitrate of iron.*

PREPARATION.—Take of fine iron wire, free from rust, one ounce; pure nitric acid, three fluid ounces; distilled water, a sufficient quantity: into the acid, first diluted with sixteen ounces of the water, introduce the iron wire, and leave them in contact until gas ceases to be disengaged. Filter the solution, and to it add as much water as will make its bulk one pint and a-half. The specific gravity of this solution is 1107.

PHYSICAL PROPERTIES.—A transparent liquid, of a fine orange-brown colour; with a weak nitric acid odour, and an acid, styptic taste.

CHEMICAL PROPERTIES.—From the solution, large transparent, colourless crystals may be procured; according to Pelouze, their composition is 2 atoms of peroxide of iron ($\text{Fe}^2 \text{O}^3$), 3 of nitric acid, and $1\frac{1}{2}$ of water. If kept in a bottle not quite filled, or if exposed to heat, the solution is decomposed, peroxide of iron thrown down and nitrous acid evolved; in which state it is unfit for medical use.

THERAPEUTICAL EFFECTS.—Solution of the pernitrate of iron is an admirable astringent, possessing also tonic properties. It will be found particularly useful in chronic cases of mucous diarrhoea, accompanied by much emaciation and loss of appetite: in such I have derived much benefit from its employment after many other remedies had failed. It is also one of the best preparations of iron that can be used in strumous children with enlarged mesenteric glands and lenteric diarrhoea, for whom it may be prescribed at the same time with cod liver oil. In many cases of phthisis the ordinary astringents fail in checking the colliquative diarrhoea; but this preparation, when local inflammatory action does not forbid its use, acts most beneficially, and becomes an important aid to the oil above referred to. There is also another form of diarrhoea, which may be almost termed nervous, that occurs in females of a delicate and weakly habit, in which the solution of pernitrate of iron is very efficacious: this form of the disease, and the effects of this remedy in it, have been most graphically described by Dr. Graves, who was the first in this country to call the attention of the profession to this most useful medicine soon after

its introduction into practice by Mr. Kerr of Glasgow.* Professor Montgomery, of this city, informs me that he has used the perntrate of iron extensively in the treatment of mucous discharges from the vagina, and that in such cases he considers it the best of the ferruginous preparations.

DOSE AND MODE OF ADMINISTRATION.—f3ss. to f3j. for adults; min. x. to min. xx. for children. It is best given diluted with water and sweetened with *simple* syrup. It may be also administered in the form of enema in the proportion of f3ij. to f3iv. of mucilage of starch.

INCOMPATIBLES.—All astringent vegetable infusions, decoctions, or syrups.

FERRI SULPHAS, D. L. E. FERRI SULPHAS GRANULATUM, D. *Sulphate of protoxide of iron; Green vitriol.*—*Granulated sulphate of iron.*

PREPARATION.—*Dublin.*—"Take of iron wire, or turnings of wrought iron, four ounces; oil of vitriol of commerce, four fluid ounces; distilled water, one pint and a-half. Pour the water on the iron placed in a porcelain capsule, add the oil of vitriol, and, when the disengagement of gas has nearly ceased, boil for ten minutes. Filter now through paper, and, having separated the crystals which, after the lapse of twenty-four hours, will have been deposited from the solution, let them be dried upon blotting-paper, placed upon a porous brick, and then preserved in a well-stopped bottle."

London.—"Iron-filings, ℥viij.; sulphuric acid, ℥xiv.; water, Oiv.; mix the acid with the water, and add the iron; then apply heat, and when bubbles have ceased to escape, strain the liquor, and set it aside that crystals may be formed; evaporate the liquor poured off, that it may again yield crystals. Dry them all."—An article of the *Materia Medica* in the *Edinburgh Pharmacopœia*.—FERRI SULPHAS GRANULATUM, D. "Take of iron wire, or turnings of wrought iron, four ounces; oil of vitriol of commerce, four fluid ounces; distilled water, one pint and a-half; rectified spirit, ten fluid ounces. Pour the water on the iron placed in a porcelain capsule, add the oil of vitriol, and when the disengagement of gas has nearly ceased, boil for ten minutes. Filter now through paper into a vessel containing eight ounces of the spirit, and stir the mixture as it cools, in order that the salt may be obtained in minute granular crystals. Let these, deprived by decantation and draining of the adhering liquid, be washed on a funnel or small percolator with the remainder of the spirit; and, when rendered quite dry by repeated pressure, between folds of filtering paper, and subsequent exposure for twenty-four hours beneath a glass bell, over a common dinner-plate half filled with oil of vitriol, let them be preserved in a well-stopped bottle."

PHYSICAL PROPERTIES.—Commonly met with in large transparent, pale bluish-green crystals, the primary form of which is the oblique rhombic prism. They are inodorous, but have an acid, disagreeable, styptic taste. Specific gravity, 1.82. The granulated sulphate of iron of the *Dublin Pharmacopœia* is in minute granular crystals of a greenish-blue tint, like that of beryl.

CHEMICAL PROPERTIES.—The crystals are composed of 1 equivalent of protoxide of iron, 1 of sulphuric acid, and 7 of water, ($\text{Fe O, SO}^3, \text{HO} + 6 \text{HO}$). They effloresce slightly in dry air, but if

* See my edition of Graves' Clinical Medicine, vol. 2, p. 226.

moisture be present, they attract oxygen and become covered with a brownish-yellow crust of the sesquioxide of iron. Heated, they fuse in their water of crystallization, 6 equivalents of which they part with at a temperature of 238° ; at a red heat they are decomposed, the sulphuric acid driven off, and the red peroxide, *colcothar*, left. Sulphate of iron requires for its solution twice its weight of cold water, and three-fourths of its weight of boiling water. It is insoluble in alcohol. The solution reddens litmus paper. The second process of the Dublin College is introduced with the view of affording a salt *perfectly* free from the sesquioxide. It is the method proposed by M. Berthemot, and yields a beautiful preparation, the presence of the rectified spirit preventing any absorption of oxygen from the air during the process of crystallization and drying. Sulphate of protoxide of iron is best preserved in pure alcohol.

Adulterations.—The presence of the sesquioxide, which is very common in the commercial salt, is known by the yellowish-brown colour of the crystals. It is often contaminated with copper, which may be readily detected by immersing a polished plate of iron in a solution of the salt, on which the copper will be deposited if any be present.

THERAPEUTICAL EFFECTS.—Sulphate of iron in doses of ʒij. and upwards, if it be not rejected by vomiting, is an irritant poison; taken in small doses, frequently repeated, it acts as a tonic and astringent; with the latter intention it is employed in passive hemorrhages, in chronic diarrhœa and dysentery, and in atonic mucous discharges. As a topical remedy it is used to check bleeding from small blood-vessels, and in solution as an astringent lotion or injection, to ulcers, in chronic ophthalmia, and in chronic discharges from mucous membranes as in leucorrhœa and gleet. On the continent it is also very generally employed as a local application in erysipelas, and it is stated, with most excellent effect; but those who have used it in this country do not report so favourably of its action. Velpeau was the first who recommended the use of sulphate of iron in this disease; he employed it both in solution and in the form of ointment. The former, which consists of one part of the salt dissolved in fifteen parts of water, he uses whenever the inflamed parts can be kept covered with lint soaked in it; but when this cannot be conveniently effected, he employs an ointment composed of one part of the sulphate, and three or four parts of prepared lard. I have used a weaker ointment than this, ʒss. to ʒj. of lard, with very great benefit in some severe cases of acute impetigo, after the pustules had burst. (See, also, *Tonics*).

DOSE AND MODE OF ADMINISTRATION.—Gr. j. to gr. v. in pill.—*Ferri sulphas siccatus*, D.—*exsiccatus*, E. (“Take of granulated sulphate of iron, any convenient quantity. Expose the salt in a porcelain capsule to an oven heat not exceeding 400° , until aqueous vapours cease to be given off, and, having then reduced it to a fine powder, preserve it in a well-stopped bottle,” D. “Expose sulphate of iron to a moderate heat, in an unglazed earthen vessel, till it be-

come white and perfectly dry," E.) A more convenient preparation for internal use than the crystallized salt; 3 grains are equal to nearly five of the crystals; Dose, gr. ss. to gr. iij.—*Pilula sulphatis ferri*, E. (Dried sulphate of iron, 2 parts; extract of taraxacum, 5 parts; liquorice root powder, 3 parts; conserve of red roses, 5 parts; beat them together into a proper mass, which is to be divided into five grain pills). Each pill contains $\frac{2}{3}$ of a grain of dried sulphate of iron; Dose, one to three pills. For external use, gr. ij. to gr. x. may be dissolved in fʒj. of water.

INCOMPATIBLES.—The alkalies, and their carbonates; nitric acid; lime water; nitrate and tartrate of potash; iodide of potassium; borax; chloride of barium and nitrate of baryta; acetate of lead; the soaps, and all vegetable astringents.

GALLÆ, D. L. E. *Galls*; *Nutgalls*; *Gall-nuts*; *The Excrescences* (formed by *Diplolepis gallæ tinctorum*, D.—*Diseased buds*, L.) of *Quercus infectoria*.—This tree is a native of Asia Minor; it belongs to the Natural family *Cupuliferae* (*Corylaceae*, Lindley,) and to the Linnæan class and order *Monœcia Polyandria*. Galls are formed on the young branches in consequence of the irritation produced by the puncture of an hymenopterous insect, the *Diplolepis gallæ tinctorum*, which punctures the bark for the deposition of its eggs.

PHYSICAL PROPERTIES.—Galls vary in size from that of a large pea to that of a cob-nut. They are of a greyish-green colour, tuberculated on the surface, the tubercles and intervening spaces smooth; hollow, and of a yellowish-white colour internally. They have an intensely astringent taste, but no odour. Galls are imported principally from Constantinople and Smyrna, but some are brought from the East Indies. In commerce, two kinds of galls are commonly met with, blue or green galls, and white galls; the former are gathered before the escape of the insect, and are the best; the latter are perforated with a small circular hole through which the insect has escaped, are larger, of a paler colour, but are much inferior in astringency.

CHEMICAL PROPERTIES.—Galls are composed of about 26 per cent of tannin with a trace of gallic acid, extractive matter, a compound of pectic acid and tannin insoluble in cold water, and tannates and galates of potash and of lime (*Berzelius*). They yield their astringent property to water, proof spirit, alcohol, and ether. Of these, water is the best solvent; the solution gives a curdy precipitate with solution of gelatine (*tannate of gelatine*, the basis of leather), and a bluish-black precipitate with salts of the sesquioxide of iron (*tannogallate of iron*, the basis of ink).

Galls are not liable to adulteration in the English trade.

THERAPEUTICAL EFFECTS.—Galls are among the most powerful vegetable astringents we possess, nevertheless they are but seldom employed internally in medicine; and certainly not so much as they

deserve, if we take into account not alone their medicinal activity but their cheapness; they may be used in passive hemorrhages, in chronic diarrhœa or dysentery, in gleet and in leucorrhœa. They are the best antidote in poisoning with tartar emetic, ipecacuanha, emetina, and the vegetable alkaloids generally. Externally galls are employed as topical astringents in the milder forms of hemorrhoids, in relaxation of the uvula and tonsils, in chronic ulcerations of the mouth and fauces, and in atonic mucous discharges.

DOSE AND MODE OF ADMINISTRATION.—*Internally* in powder, gr v. to ʒj.—*Infusum Gallæ*, (Galls, powdered, ʒiv.; boiling water, fʒvj.) Dose, fʒss. to fʒij.—*Tinctura Gallæ*, D. L. *Tinctura Gallarum*, E. (Galls, in fine powder, ʒv. (ʒij., E.); proof spirit, Oj. (Oj., E.); macerate for fourteen (seven, E.) days, (strain, express, D.), and filter; “or may be prepared by percolation, as tincture of capsicum,” E.) Dose, fʒss. to fʒij.—*Externally*, ʒij., infused in Oj. of water for a gargle, lotion, or injection.—*Unguentum Gallæ*, D. (Take of galls, in very fine powder, one drachm; ointment of white wax, seven drachms. Rub the powdered galls with the ointment, until a uniform mixture is obtained).—*Unguentum Gallæ compositum*, L.—*Gallæ et opii*, E. (Galls finely powdered, ʒij.; hard opium in powder, ʒss. (ʒj., E.); lard, ʒij. (ʒj., E.); triturate well together). The opium in the London and Edinburgh formulæ is esteemed by some an excellent addition to this ointment, but I have often found it to cause much irritation when applied to hemorrhoids that were at all inflamed; and another objection to its use in hemorrhoidal affections is, that being introduced within the rectum, it is apt to cause constipation.

INCOMPATIBLES.—The mineral acids; salts of iron and lead; sulphate of copper; nitrate of silver; carbonates of potash and of soda; lime water; tartar emetic; and infusions of cinchona, calumba, cusparia, ipecacuanha, opium, &c.

GRANATUM, L.—*The bark of the fruit of Punica Granatum.* This tree has been described in the division *Anthelmintics*.

PHYSICAL PROPERTIES.—The fruit-rind is met with in the shops, in arched, irregular pieces, reddish-brown and warty on the outside, yellowish within, about a line in thickness; inodorous; with a bitter, astringent taste. The flowers are reddish, and have a weak astringent taste, but no odour; they are not used at present.

CHEMICAL PROPERTIES.—The rind of the pomegranate consists of 18·8 per cent of tannin, 17·1 of mucilage, 10·8 of extractive, 30 of lignin, and a trace of resin. It yields its astringency to both water and alcohol.

THERAPEUTICAL EFFECTS.—Pomegranate-rind may be used as an astringent in the same cases as the other vegetable remedies of this class; but at present it is rarely employed.

DOSE AND MODE OF ADMINISTRATION.—In powder, 3ss. to ʒj. *Decocti Granati*, L. (Pomegranate-rind, ʒij.; distilled water. Oiss.; boil down to Oj. and strain). Dose, fʒss. to fʒj.

INCOMPATIBLES.—All substances incompatible with tannin.

HÆMATOXYLUM CAMPEACHIANUM, D. HÆMATOXYLON, E. HÆMATOXYLUM, L. *Logwood*; *Wood of Hamatoxyllum Campeachianum*.—A native of Campeachy in Central America, now naturalized in Jamaica. It belongs to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL CHARACTERS.—Stem crooked, about 8 inches in diameter, and 40 or 50 feet high; Leaves large, pinnate; Flowers yellow, in racemes.

PHYSICAL PROPERTIES.—The heart-wood of the tree which is of a dark-red colour, is alone employed, the bark and alburnum being chipped off. It is imported in billets, which are dense and hard, have a feeble agreeable odour, and a sweetish astringent taste.

CHEMICAL PROPERTIES.—Logwood contains a peculiar red, crystalline, bitter principle, which has been named *hamatin* or *hamatoxylin*, resin, volatile oil, some tannin, acetic acid, and various salts. *Hamatin* is often found in the fissures of the wood, in beautiful, large, red crystals. Logwood yields its active principles to both water and alcohol; the solutions are of a fine purple colour, which is changed to violet by the alkalies; with alum, or acetate of lead, a blue precipitate is produced; a dark brown, with the sesquisalts of iron; and a reddish with gelatine. It is consequently very much employed as a dye wood.

Adulterations.—Various red-coloured woods are substituted for logwood, from which they may be readily distinguished, by their not possessing the same agreeable odour.

THERAPEUTICAL EFFECTS.—Logwood is an excellent astringent in chronic diarrhœa and dysentery, for which it is peculiarly adapted, as, although it checks the excessive discharge, it does not produce constipation. It has been also used in the profuse sweating of phthisis, and in diabetes.

DOSE AND MODE OF ADMINISTRATION.—*Decoctum Hamatoxyli*, D. E. (Logwood, in small chips, ʒj.; (cinnamon, powdered, ʒj. E.); water, Oss. (Oj., E.); “Boil for ten minutes in a covered vessel, and strain. The product should measure about eight ounces,” D. “Boil the logwood in the water down to one half, adding the cinnamon towards the close; and strain,” E.). Dose, fʒj. to fʒij.—*Extractum Hamatoxyli*, L. E. (Logwood, powdered (in chips, E.), lbiss. (lbj. E.); boiling water (distilled, L.), cong. ij. (cong. j., E.); macerate for 24 hours, then boil down to cong. j. (Oiv. E.), strain while hot, and evaporate in the water-bath, (vapour-bath, E.), to a proper consistence.) Not much used; it becomes so hard by keeping, that

pills made of it pass through the bowels unchanged. Dose, gr. x. to gr. xxx.

INCOMPATIBLES.—The mineral acids; acetic acid; lime water; tartar emetic; sulphates and acetates.

KINO, D. L. E. *Kino*; Concrete exudation of *Pterocarpus erinaceus* (the African Kino tree, D.), and of other undetermined genera and species, D. E. Extract of *Pterocarpus erinaceus*, L. Various substances have been known in commerce and described as kino; in consequence of which, both the botanical source and the part of the world from whence it was obtained were for a long time wrapped in much obscurity. In the present day nearly all that is imported is brought from Bombay, a very small quantity only being obtained from the coast of Africa, from whence, however, it was originally altogether procured. The former, East India Kino, is the product of the *Pterocarpus marsupium*, a native of the Malabar coast, belonging to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Diadelphia Decandria*. The latter, African Kino, is obtained from the *Pterocarpus erinaceus*, a native of Gambia and Senegal. Botany Bay Kino, sometimes met with also, is the inspissated juice of the *Eucalyptus resinefera*, a native of Australia and Van Dieman's Land; belonging to the Natural family *Myrtaceæ*.

BOTANICAL CHARACTERS.—*Pterocarpus marsupium*. A lofty tree, with the outer coat of the bark brown, the inner red, fibrous and astringent; Leaves, bifarious, alternate, leaflets, 5–7 alternate, elliptic, emarginate; Panicles, terminal; Flowers, white, with a yellow tinge; Legumes, long-stalked; Seed solitary, kidney-shaped.—*Pterocarpus erinaceus*. Leaflets, 11–15 alternate, ovate, oblong, obtuse or sub-emarginate; Flowers, yellow; Legumen, orbicular, membranous, undulate at the margin.

PREPARATION.—“East Indian Kino is procured when the tree is in blossom, by making longitudinal incisions in the bark round the trunk of the tree so as to let the gum ooze down into a receiver formed of a broad leaf, so placed and fixed in the bark as to prevent the gum from falling on the ground. From the leaf it is made to run into a receptacle placed under the leaf to receive the gum. When this receptacle is filled, it is removed, the gum is dried in the sun until it crumbles, and then filled into wooden boxes for exportation.” (Dr. Forbes Royle, *Pharmaceutical Journal*, vol. v. p. 495). African Kino is procured from incisions made into the trunk and branches of the tree, whence the juice exudes, and gradually concretes into brittle tears. Botany Bay Kino is obtained in a similar manner.

PHYSICAL PROPERTIES.—Kino occurs in the form of small angular fragments or tears, none of them larger than a pea, opaque, glistening, and of a reddish-black colour. They are very brittle; when chewed they adhere to the teeth, and give the saliva a blood-red colour. They are void of odour, but have an intensely astringent taste.

CHEMICAL PROPERTIES.—Kino is composed of 74 per cent. of tannin and a peculiar extractive containing catechuic acid, 24 of red gum, and 1 of insoluble matter. It is only very partially soluble in cold or boiling water; but alcohol dissolves nearly two-thirds of it, and is therefore the best menstruum for its administration in medicine.

Adulterations.—Other astringent substances, which bear a general resemblance to Kino, but are of inferior quality, are frequently sub-

stituted for it in commerce; none of them, however, have the same glistening, reddish-black colour, which is so well seen in the smaller fragments of Kino; the sophistication may, therefore, be readily detected by the eye. By employing the same tests as for catechu (see p. 55), the exact amount of tannin contained in Kino may be readily ascertained.

THERAPEUTICAL EFFECTS.—Kino is an admirable astringent, possessing nearly similar properties to catechu, and may be employed in the same diseases. It is generally supposed to be better adapted for menorrhagia and leucorrhœa; and as it is more tonic, owing to the extractive which it contains, it should be preferred where great debility exists.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to 3ss.—*Pulvis Kino compositus*, L. (Kino, 3xv.; cinnamon, 3ss.; hard opium, 3j.; rub separately to fine powder, and mix.) An excellent astringent in chronic diarrhœa and dysentery; it has been also highly praised in pyrosis; gr. xx. contain gr. j. of opium; Dose, gr. x. to gr. xxx.—*Tinctura Kino*, L. E. (Kino, in (moderately fine, E.) powder, 3iiss.; rectified spirit, Oij.; macerate (digest, E.) for 7 (14, L.) days, and filter. “This tincture cannot be conveniently prepared by percolation,” E.) Dose, f3j. to f3ij. Tincture of Kino when long kept is often converted into an insoluble gelatinous mass; no satisfactory reason has been hitherto assigned for this change taking place. It is best prevented by keeping the tincture in small bottles completely filled, so as to exclude the atmospheric air. Notwithstanding the assertion of the Edinburgh Pharmacopœia, it may be readily prepared by percolation, by previously mixing the Kino with equal parts of fine white sand. The compound powder and tincture have both been omitted from the last edition of the Dublin Pharmacopœia.

INCOMPATIBLES.—The mineral acids; carbonates of the alkalis; sulphate of iron; nitrate of silver; acetate of lead; and gelatine.

KRAMERIA, L. E. **RHATANIA**, D. *Rhatany*; *The root of Krameria triandra*. A native of Peru; belonging to the Natural family *Polygalaceæ*, and to the Linnæan class and order *Tetrandria Monogynia*.

BOTANICAL CHARACTERS.—Stem, shrubby, procumbent; Leaves, villous, silky, oblong, sessile; Flowers, solitary, reddish; stamens, 3, whence the specific name.

PHYSICAL PROPERTIES.—Numerous, long, woody root branches, to which the common root-stock about an inch in length is often attached; they consist of a reddish brown, smooth bark, nearly an eighth of an inch in thickness, and a yellow, hard, woody centre (*Meditullium*); they are inodorous, the bark has an intensely astringent, somewhat bitter taste, but the woody centre is nearly tasteless.

CHEMICAL PROPERTIES.—The bark of rhatany root consists of nearly 43 per cent. of tannin, a trace of gallic acid, 56 per cent. of gum, extractive, and colouring matter, and a small quantity of a pe-

culiar acid which has been named *Kramerie acid*. It yields its active principles to cold water and to alcohol.

THERAPEUTICAL EFFECTS.—Rhatany root is a powerful astringent and tonic, and as such is employed with much benefit in the treatment of chronic diarrhoea and of dysentery, in passive hemorrhages, in menorrhagia, and in atonic mucous discharges. As a topical astringent, it may be applied in the form of powder to indolent ulcers with excessive discharge, and as a styptic to arrest hemorrhage, when it proceeds from very small vessels. Rhatany root finely powdered is a constituent of most tooth powders; it reddens and consolidates the gums, and whitens the teeth.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to ʒss.—*Extractum Kramerie*, E. (Prepared in the same way as extract of liquorice). Dose, gr. xx. to gr. xl.—*Infusum Kramerie*, D. L. (“Take of rhatany root, bruised, half an ounce; boiling water, nine ounces; digest for one hour, in a covered vessel, and strain. The product should measure about eight ounces.” D.—“Rhatany, ʒj.; boiling distilled water, Oj.; macerate for 4 hours in a vessel lightly covered, and strain,” L.). Dose, fʒj. to fʒij. This infusion becomes quite turbid on cooling, and would be better made with cold water by the process of percolation.—*Tinctura Kramerie*, D. (Take of rhatany root, in coarse powder, eight ounces; proof spirit, two pints: macerate for fourteen days, strain, express, and filter). Dose, fʒjss. to fʒij.

INCOMPATIBLES.—All substances incompatible with tannin.

MATICO, D. *Matico; the leaves of Artanthe elongata*.—This substance was introduced to the notice of the profession a few years ago by Dr. Jeffreys of Liverpool. It is stated by the Dublin College, on the authority of Miquel, to be the leaves of *Artanthe elongata* (*Piper angustifolium*, Ruiz and Pavon), a native of Peru, belonging to the Natural family *Piperaceæ*, and to the Linnæan class and order *Dianthia Trigynia*.

PROPERTIES.—The leaves as imported are attached to the stem, and the flowering spike is also often present. They have an aromatic, scarcely astringent taste, and an agreeable aromatic odour, somewhat resembling that of sage. They yield their active principles to water and to alcohol. According to the analysis of Dr. Hodges, Matico consists of a bitter principle (*Maticine*), and an aromatic volatile oil, soft resin, colouring matter, salts, chlorophylle, gummy matter, and lignin. Two kinds of the herb have been forwarded to this country, the one *green* and the other *yellow*; the latter, which appears to have been gathered when the plant was riper, is much the more active.

THERAPEUTICAL EFFECTS.—This substance is held in high esteem as a styptic and astringent in its native country, and the trials that have been made with it since it was first introduced into England by

Dr. Jeffreys, prove that it possesses both these properties. As an astringent it has been employed internally in the same cases as the other vegetable remedies of this class, over which it does not appear to possess any remarkable advantages. I have found the tincture very useful in the treatment of catarrh of the bladder in the aged. It is, however, chiefly as a styptic in external cases of hemorrhage, that it has been lauded; and from the numerous cases that have been published in which it has arrested bleeding from small blood-vessels, as from leech-bites, after the ablation of nævi, from incisions, &c.; there can be no doubt of its being a styptic of much power.

DOSE AND MODE OF ADMINISTRATION.—In powder gr. x to ʒss. —*Infusum Matico*, D. (Take of matico leaves, cut small, half an ounce; boiling water, half a pint: infuse for one hour, in a covered vessel, and strain. The product should measure about eight ounces). Dose, from fʒj. to fʒij. two or three times a day.—*Tinctura Matico*, D. (Take of matico leaves, in coarse powder, eight ounces; proof spirit, two pints: macerate for fourteen days, strain, express, and filter). Dose, fʒj. to fʒij. To arrest hemorrhage, the *under* side of the leaf is to be applied to the bleeding surface.

INCOMPATIBLES.—The mineral acids; the alkalies; the sesquisalts of iron; acetate of lead; and the tincture or infusion of galls.

MONESIA.—Under this name, an astringent extract was imported into France some years since from South America; it is obtained from the bark of the *Chrysophyllum glycyphleum* (Casaretti), a native of Brazil, belonging to the Natural family *Sapotaceæ*. The extract is brought over in large cakes which are purified by dissolving them in water, filtering and evaporating; the purified extract is in small fragments resembling kino in appearance, but it has not the peculiar ruby lustre of that substance; the taste is at first sweetish, then astringent and somewhat acrid, and the odour feebly aromatic; it dissolves readily in water, affording a dull brown, somewhat opaque solution; is partly soluble in alcohol, and only very sparingly soluble in ether. According to the analysis of MM. Derosne and Henry, it consists of tannin, red colouring matter, glycirrhizine, a peculiar acrid principle which they have named *Monesine*, and various salts.

Like numerous other medicines when first introduced, Monesia was extravagantly lauded as a remedy possessing powerfully astringent properties; experience has however proved that it is much inferior to either kino or catechu, and it probably may take an intermediate station between these substances, and extract of rhatany. It has been used in all cases where astringents are admissible, both externally and internally, but the disease in which it appears to have been most serviceable is chronic diarrhœa.

DOSE AND MODE OF ADMINISTRATION.—In substance, gr. v. to gr. xv.—*Tinctura Monesiæ*, DONOVAN. (Extract of monesia, ʒj.; proof spirit, fʒixss.; water, fʒij.; mix, and when the feces have subsided

pour off the tincture). Dose, f3j. to f3ij.—*Mistura Monesiae*, (Extract of monesia, ʒij.; water, f3viiss.; compound tincture of cardamoms, f3ss.; mix). Dose, f3ss. to f3ij. two or three times a day.

INCOMPATIBLES.—Mineral acids; salts of iron, zinc and lead; opium; and sulphate of quina.

PLUMBI ACETAS, D. L. E. *Acetate of Lead; Sugar of lead.*

PREPARATION. *London*.—"Oxide of lead rubbed to powder, ℥iv. ʒij.; acetic acid; and distilled water, of each, Oiv.; mix the acid with the water, and add the oxide of lead to them, dissolve with a gentle heat, and strain: lastly evaporate, so as to form crystals." *Edinburgh*.—"Pyroligneous acid of the density 1034, Oij.; distilled water, Oj.; litharge, ʒxiv.; mix the acid and water, add the litharge, dissolve it with the aid of a gentle heat, filter, and concentrate the solution sufficiently for crystallization on cooling." Acetate of lead is an article of the *Materia Medica* in the *Dublin Pharmacopœia*.

PHYSICAL PROPERTIES.—Usually met with in irregular white masses of acicular crystals; having an acetous odour, and a sweetish astringent taste; the crystals are right rhomboid prisms with dihedral summits; density, 2.345.

CHEMICAL PROPERTIES.—Acetate of lead consists of 1 equivalent of protoxide of lead, 1 of acetic acid, and 3 of water (Pb O , $\text{C}^4\text{H}^3\text{O}^3 + 3\text{HO}$). It effloresces slowly by exposure to the air, losing part of its acetic acid and attracting carbonic acid, thereby becoming partially insoluble. By heat, the salt fuses in its water of crystallization which is all driven off; and if the heat be increased, decomposition takes place. It is soluble in once and a half its weight of water at 60° , in less of boiling water, and in 8 parts of alcohol. The solution reddens litmus paper.

Adulterations.—This salt is usually met with in commerce sufficiently pure for medical use. In the *Edinburgh Pharmacopœia* the following tests are given, by which a hundredth part of impurity may be easily detected.—"Entirely soluble in distilled water, acidulated with acetic acid: 48 grains thus dissolved are not entirely precipitated by a solution of 30 grains of phosphate of soda."

THERAPEUTICAL EFFECTS.—Acetate of lead taken in large doses acts as an irritant, causing inflammation of the stomach and intestines, with intense pain and vomiting. In medicinal doses it operates as a sedative-astringent, and as such is employed with benefit in the treatment of disease, where the indication is to lower the circulation, and at the same time check excessive discharges. In all forms of passive hemorrhage it proves singularly serviceable; and when the bleeding is of an active character it may be beneficially employed in conjunction with antiphlogistic treatment. In the autumnal cholera of this country, acetate of lead, combined with opium, is the remedy on which most reliance is to be placed; and this combination has also proved eminently successful in the treatment of Asiatic cholera, for which it was first proposed by Dr. Graves, rarely failing to check the premonitory diarrhœa when administered sufficiently early in the disease. In chronic diarrhœa and dysentery it also proves service-

able; but for diminishing expectoration, and checking the colliquative sweating and diarrhœa of phthisis, it is much inferior to dilute sulphuric or acetic acid. Acetate of lead precipitates the active principle of the gastric juice, on which account its use should not be too long continued; and for the same reason it should not be employed as an astringent in dyspeptic disorders. As a topical remedy, a solution of this salt is employed with benefit in most forms of superficial inflammation of a phlegmonous character, in ophthalmia, in gonorrhœa, gleet, and leucorrhœa, and in cutaneous eruptions attended with surrounding inflammation. A collyrium of the acetate of lead should not be employed in any form of ophthalmia when the cornea is ulcerated, as it produces an indelible white stain which becomes imbedded in the substance of the cornea; an observation first made by Dr. Jacob of this city. It has been also successfully applied in powder to the inner surface of the eyelids in granular ophthalmia.

DOSE AND MODE OF ADMINISTRATION.—Gr. ij. to gr. viij. in the form of pill, twice or thrice daily.—*Pilulæ plumbi opiata*, E. (Acetate of lead, 6 parts; opium, 1 part; conserve of red-roses, about 1 part; beat them into a proper mass, which is to be divided into four grain pills.—This pill may be made also with twice the quantity of opium). This forms a most useful astringent combination; each pill contains 3 grains of acetate of lead, and half a grain of opium; Dose, 2 or 3 pills, three times a day.—*Unguentum (Ceratum, L.) plumbi acetatis*, D. L. E. ("Take of acetate of lead, in very fine powder, one ounce; ointment of white wax, one pound: melt the ointment with a gentle heat, then add the acetate of lead gradually, and stir the mixture constantly until it concretes," D.—"Acetate of lead, powdered, ʒij.; white wax, ʒij.; olive oil, fʒviij.; dissolve the wax in fʒviij. of the oil, then to these add gradually the acetate of lead rubbed separately with the remainder of the oil, and stir with a spatula till they unite," L.—"Simple ointment, ʒxx.; acetate of lead, in fine powder, ʒj.; mix them thoroughly," E.). A soothing and astringent application to irritable ulcers, or excoriated parts.

INCOMPATIBLES.—Hard water; the mineral acids and their salts; citric, tartaric, and carbonic acids, and their salts; the alkalies; lime-water; iodide of potassium; tincture of galls; opium; albuminous liquids; and various vegetable infusions.

When an overdose of acetate of lead has been taken, sulphate or phosphate of soda, and sulphate of magnesia, are the best antidotes; their administration should be succeeded by emetics, and afterwards by active purgatives, and opium.

PLUMBI CARBONAS, D. L. E. *Carbonate of Lead; White Lead; Cerusse.*

PREPARATION.—An article of the *Materia Medica*. On the large scale it is generally prepared by exposing bars or plates of lead to the fumes of strong acetic, or pyrolig-

neous acid, disengaged from the iron pots in which it is contained, by placing them in a mixture of dung and tanners' refuse. The carbonate forms on the surface of the lead, and is detached by rolling the plates under water. On the continent it is also frequently prepared by transmitting a current of carbonic acid gas through a solution of acetate of lead.

PHYSICAL PROPERTIES.—A heavy, white, obscurely crystalline powder; sometimes met with in greyish-white, chalk-like masses; inodorous, and tasteless.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of protoxide of lead, and 1 of carbonic acid, (PbO , CO^2). Exposed to heat it parts with its carbonic acid, and is converted into the yellow oxide of lead. It is insoluble in water, but dissolves in nitric acid with effervescence.

Adulterations.—Carbonate of lead is very much adulterated: the impurities generally found in it are chalk, sulphate of baryta, and sulphate of lead; the two latter may be detected by their insolubility in dilute nitric acid. The presence of chalk may be discovered by dissolving the suspected specimen in dilute nitric acid, throwing down the lead from the solution by sulphuretted hydrogen, filtering, and adding solution of oxalate of ammonia; when, if any chalk had been present, a white precipitate (oxalate of lime) will be produced.

THERAPEUTICAL EFFECTS.—Carbonate of lead is more apt to produce lead-colic than any other of the preparations of this metal, it is consequently never used internally. Topically it acts as a sedative-astringent, and is employed in the form of ointment to promote the cicatrization of excoriated parts and slight ulcerations. Spread on leather, it is said to prove useful applied over the seat of the pain in local neuralgia.—*Unguentum plumbi carbonatis*, D. E. ("Take of carbonate of lead, in very fine powder, three ounces; ointment of white wax, one pound: melt the ointment with a gentle heat, then add the carbonate of lead gradually, and stir the mixture constantly until it concretes." D.—"Simple ointment, $\mathfrak{z}\text{v}$.; carbonate of lead, $\mathfrak{z}\text{j}$.; mix thoroughly," E.).

PLUMBI DIACETATIS (SUBACETATIS, D.) LIQUOR, D. L. PLUMBI DIACETATIS SOLUTIO, E. *Solution of Subacetate or Diacetate of Lead; Gowlard's extract; Extract of Saturn.*

PREPARATION.—*Dublin.*—"Take of acetate of lead, six ounces; litharge, in fine powder, four ounces; distilled water, two pints: dissolve the acetate of lead in the water, and, when the solution is raised to its boiling temperature, add the litharge in successive portions, and boil gently for half an hour. Add now as much distilled water as will supply what has been lost by evaporation, and filter through paper into a bottle, which should be furnished with an air-tight stopper. The specific gravity of this solution is 1066." *London.*—"Acetate of lead, lbij . $\mathfrak{z}\text{ij}$.; oxide of lead, rubbed to powder, lbj . $\mathfrak{z}\text{iv}$.; water, Oiv .; boil them for half-an-hour, frequently stirring, and when the liquor is cold, add of distilled water as much as may be sufficient to measure with it, Ovj .; lastly strain the solution." *Edinburgh.*—"Acetate of lead, $\mathfrak{z}\text{vj}$. $\mathfrak{z}\text{vj}$.; litharge, in fine powder, $\mathfrak{z}\text{iv}$.; water, Oiss .; boil together, stirring occasionally; when

the solution is cold, add water, if necessary to make up Oiss.; and then filter. Preserve the solution in well-closed bottles."

PHYSICAL PROPERTIES.—This solution is transparent and colourless; it has a weak acetous odour, and a sweetish, astringent taste. Specific gravity, 1·066 (D.); 1·260 at 62° (L.).

CHEMICAL PROPERTIES.—It is an aqueous solution of the tribasic acetate of lead, which salt may be obtained in a crystalline form by evaporation; crystallized subacetate of lead is composed of 1 equivalent of acetic acid, 3 of protoxide of lead, and 1 of water, (3PbO , $\text{C}^4\text{H}^3\text{O}^3 + \text{HO}$). Exposed to the air it deposits a white precipitate of carbonate of lead; the same effect is produced by adding a solution of carbonic acid or a carbonate. The solution is powerfully alkaline.

THERAPEUTICAL EFFECTS.—This solution is not used internally; externally, it is employed, diluted with from 20 to 40 parts of distilled water according to circumstances, in the same cases as a solution of acetate of lead; the only advantage it possesses over which is, that it does not dry up so quickly.—*Plumbi subacetatis liquor compositus*, D. *Liquor Plumbi diacetatis dilutus*, L. ("Take of solution of subacetate of lead; proof spirit, of each, two fluid ounces; distilled water, half a gallon: mix, filter, and preserve in a well-stopped bottle." D.—"Solution of diacetate of lead; distilled water, Oj.; proof spirit, f3ij.; mix," L.). The preparation of the London College is too weak for general use.—*Ceratum Plumbi compositum*, L. (Solution of diacetate of lead, f3iij.; wax, ʒiv.; olive oil, Oss.; camphor, ʒss.; mix the melted wax with f3viiij. of the oil, then remove them from the fire, and, when first they begin to thicken, add gradually the solution of diacetate of lead, and stir them constantly with a spatula until they cool; lastly, mix with them the camphor dissolved in the remainder of the oil). *Gowlard's cerate*; employed as a dressing to diminish pain and irritation.

INCOMPATIBLES.—Same as for acetate of lead; solution of gum; organic matter; and soap liniment.

LITHARGYRUM, D. E. PLUMBI OXYDUM SEMIVITREUM, L. *Fused (partially fused, D.), protoxide of lead; Litharge.* Though much employed in pharmacy and the arts, litharge is only used in medicine as a desiccative and astringent powder, to sprinkle over excoiated parts and superficial ulcerations. It enters into the composition of the following ointments:—*Emplastrum Lithargyri*, D. E. *Emplastrum Plumbi*, L. (Litharge, in very fine powder, lbv. (lbvj. L. ʒv. E.); olive oil, cong. j. (f3xij. E.); water, Oij. (f3iij. E.); boil together, (over a gentle fire, D. L.); stirring constantly, until the oil and litharge unite into the consistence of a plaster (acquire such consistence that they will solidify on cooling, D.), it will be proper to add a little boiling water if it evaporate too far). *Diachylon-plaster*; It is used for retaining the edges of fresh wounds in con-

tact, and as the basis of many other plasters.—*Unguentum Plumbi compositum*, L. (Prepared chalk, ℥viiij.; distilled vinegar, f℥vj.; plaster of lead, ℔iij.; olive oil, Oj.; melt the plaster in the oil with a slow fire; then gradually add the chalk separately mixed with the vinegar, the effervescence being finished, and stir constantly till they are cooled). Generally used as a dressing for indolent ulcers.—*Emplastrum Resinæ*, D. L. *Emplastrum Resinorum*, E. (“Take of resin, in powder, four ounces; castile soap, in powder, two ounces; litharge plaster, two pounds: to the litharge plaster previously melted over a gentle fire, add the resin and soap, and mix them intimately,” D.—“Litharge plaster, ℔iij. (℥v. E.); resin, ℔ss. (℥j. E.); Add the resin powdered, to the litharge plaster melted over a slow fire and mix,” L. E.) The London and Edinburgh preparations constitute the *adhesive*, or *sticking plaster* of the shops, commonly used for retaining the edges of wounds in contact, and for strapping ulcers. That of Dublin is a substitute for the *emplastrum saponis compositum vel adherens* of the pharmacopœia of 1826, and which is usually employed spread on linen as an application to prevent bed-sores.—*Emplastrum Saponis*, D. L. E. (“Take of castile soap, in powder, four ounces; litharge plaster, two pounds and a half: to the plaster, previously melted over a gentle fire, add the soap, and heat them together, until they are thoroughly incorporated,” D.—“Litharge plaster, ℔iij. (℥iv., E.); soap, (Castile, E.), sliced, ℔ss. (℥j.; gum-plaster, ℥ij., E.); melt the plasters, add the soap, and boil down to a proper consistence,” L. E.). This plaster when kept is apt to crumble to powder, to obviate which the Edinburgh College has added the gum-plaster. It is chiefly employed to give mechanical support.—*Ceratum Saponis*, L. (Soap, ℥x.; wax, ℥xiiss.; oxide of lead, powdered, ℥xv.; olive oil, Oj; vinegar, cong. j.; boil the vinegar with the oxide of lead over a slow fire, constantly stirring them till they unite; then add the soap, and boil again in a similar manner, until all the moisture is evaporated; lastly, mix with these the wax previously dissolved in the oil). A cooling, astringent dressing.

QUERCUS, L. QUERCUS CORTEX, D. E. *Oak-bark*; *Bark of Quercus pedunculata* (Willdenow).—Indigenous; belonging to the Natural family *Cupuliferae* (*Corylaceæ*, Lindley), and to the Linnæan class and order *Monœcia Polyandria*.

BOTANICAL CHARACTERS.—A large, long-lived tree; Leaves, bright green, deciduous; Flowers, *male*, yellowish; *female*, greenish tinged with brown; Fruit (acorns,) 2 or 3 on a long peduncle, surrounded at the base by the cupule.

PHYSICAL PROPERTIES.—Oak-bark is in pieces of various lengths, silvery-gray on the outside, reddish-brown within; inodorous; taste powerfully astringent; the pieces are brittle and break with a short fracture.

CHEMICAL PROPERTIES.—It contains from 15 to 20 per cent. of

tannin, with some gallic acid, uncrystallizable sugar, pectin, and salts. It yields its virtues to both water and alcohol.

THERAPEUTICAL EFFECTS.—Oak-bark is an excellent astringent; and may be employed in the treatment of chronic diarrhoea and dysentery, in alvine hemorrhages, and to check atonic mucous discharges. As a topical remedy, it is used with benefit in the form of decoction: as a gargle in relaxation of the uvula and tonsils; as an injection in flour albus, and in prolapsus of the uterus or rectum; and as a lotion in reducible hernia to render the sac more tense.

DOSE AND MODE OF ADMINISTRATION.—In powder, a bad form, ʒss. to ʒj.—*Decoctum Quercus*, D. L. E. (Oak-bark, (bruised, D. L.), ʒiss. (3x., L. E.); water (distilled, L.), Oj. (Oiss., D.); boil down to Oj. (for ten minutes in a covered vessel, D.), and strain). Dose, fʒj. to fʒiv. A convenient strength for a gargle, injection, or lotion.

INCOMPATIBLES.—All substances incompatible with tannin.

ROSA GALLICA, D. L. E. *French rose; Red-rose; Petals of Rosa Gallica.*—A native of the middle and south of Europe, now cultivated extensively in our gardens. It belongs to the Natural family *Rosaceæ*, and to the Linnæan class and order *Icosandria Polygynia*.

BOTANICAL CHARACTERS.—An undershrub, very variable in size and character, owing to cultivation; the flowers are of a fine purplish-red colour, spreading.

PHYSICAL PROPERTIES.—The dried petals have a velvety appearance, an agreeable roseate odour which is developed during desiccation, and a somewhat aromatic, bitter, astringent taste. They should be gathered before the flowers expand, the white claw cut off, and then dried quickly with a stove heat.

CHEMICAL PROPERTIES.—They consist of volatile oil, tannin, gallic acid, colouring matter, albumen, fatty matter, and some salts. They yield their properties to boiling water, affording a reddish-yellow solution, which is changed to bright red by sulphuric acid.

THERAPEUTICAL EFFECTS.—The petals of the red-rose are very mildly astringent, and are chiefly employed in medicine on account of their colour and odour, the officinal preparations forming agreeable vehicles for the administration of more active medicines.

DOSE AND MODE OF ADMINISTRATION.—*Infusum Rosæ*, E. *Infusum Rosæ acidum*, D. *Infusum Rosæ compositum*, L. ("Take of petals of the Gallic rose, dried, two drachms; dilute sulphuric acid, one fluid drachm; boiling water, half a pint: infuse the petals for one hour in the water, in a covered vessel, strain, and add the acid. The product should measure about eight ounces," D. "Red-rose petals, dried, ʒiij.; dilute sulphuric acid, fʒiss.; sugar, ʒvj.; boiling distilled water, Oj.; pour the water on the rose petals in a glass vessel; then mix in the acid. Macerate for six hours, and strain the liquor, lastly add the sugar to it;" L.—The *Edinburgh College* employs the same proportions as the *London*; The petals are to be infused in the water in a covered vessel of glass

or porcelain, not glazed with lead, for an hour; the acid added, the liquor strained through linen or calico, and the sugar dissolved in it). An agreeable refrigerant and mild astringent; Dose, fʒss. to fʒij. It forms one of the best vehicles for the administration of the neutral purgative salts. The preparation of the Dublin Pharmacopœia contains more than double the amount of acid in that of the former edition, and is also stronger than the infusions of the other British Colleges.—*Confectio Rosæ*, D. *Confectio Rosæ Gallicæ*, L. *Conserve Rosæ*, E. ("Take of dried petals of the Gallic rose, one ounce; rose-water, two fluid ounces; refined sugar, eight ounces: macerate the petals in the rose-water for two hours, add the sugar gradually, and beat them into a uniform mass. Or,—Take of fresh petals of the Gallic rose, three ounces; refined sugar, eight ounces: rub the petals in a mortar, then add the sugar gradually, and beat them together till they are intimately mixed." D.—"Red-rose petals, ℥j.; pure sugar, ℥iij.; bruise the petals in a stone mortar, then the sugar being added, pound them again until they are thoroughly incorporated," L.—"Beat the petals of *Rosa Gallica* to a pulp, gradually adding twice their weight of sugar," E.). A very weak astringent; Dose, ʒj. to ʒij. It is principally used as a basis for pills, for which purpose it is the best material that can be used, as it neither hardens nor becomes candied by keeping. It should not be employed for pills containing a sesquisalt of iron, in consequence of the tannin it contains.—*Mel Rosæ*, L. E. (Red-rose petals, dried, ʒiv.; boiling water, Oiiiss.; honey, ℔v.; "Macerate the rose-petals in the water for six hours, then add the honey to the strained liquor, and, in a water bath, boil down to the consistence of syrup," L.—"Infuse the petals in the water for six hours, strain and squeeze; let the impurities subside; pour off the clear liquor, mix with it the honey, and evaporate the whole to the consistence of syrup, removing the scum," E.). Chiefly employed as an addition to astringent gargles; Dose, ʒij. to ʒiv.—*Syrupus Rosæ Gallicæ*, D. E. ("Take of petals of the Gallic rose, dried, two ounces; boiling distilled water, one pint; refined sugar, in powder, as much as is sufficient: boil the petals in the water, in a glass or porcelain vessel, until their colour is completely extracted; strain with expression, and let the decoction stand until the sediment subsides; then, having decanted the supernatant liquor, add to it twice its weight of sugar, and dissolve with the aid of a steam or water heat." D.—"Dried red-rose petals, ʒij.; pure sugar, ʒxx.; boiling water, Oj.; infuse the petals in the water for 12 hours, strain the liquor, and dissolve the sugar in it with the aid of heat," E.). Principally used for imparting its fine red colour to mixtures, &c.

INCOMPATIBLES.—All substances incompatible with tannin.

BORAX; SODÆ BIBORAS, D. L. E.—*Borax*; *Biborate of Soda*.

PREPARATION.—An article of the *Materia Medica*; on the large scale it is prepared

either by refining crude borax of commerce, *Tincal*, a natural crystalline formation, met with on the shores of some lakes in Thibet and Persia ; or by saturating native boracic acid, obtained from the lagoons of Tuscany, with carbonate of soda.

PHYSICAL PROPERTIES.—Usually met with in large, translucent, colourless crystals aggregated together ; the crystals are either oblique rhombic prisms, or regular octohedrons ; inodorous ; with a somewhat styptic alkaline taste.

CHEMICAL PROPERTIES.—Crystallized borax consists of 1 equivalent of soda, 2 of boracic acid, and 10 of water, ($\text{Na O}, 2 \text{BO}^3 + 10 \text{HO}$) ; but *octahedral borax* contains only 5 equivalents of water. Exposed to the air it effloresces slowly ; heated it melts in its water of crystallization, which if the heat be increased is driven off, and a light anhydrous salt, *calcined borax*, left ; at a still higher temperature it fuses again, and as it cools forms a transparent solid, *glass of borax*. Borax is soluble in 12 parts of cold and 2 of boiling water ; the solution is alkaline, changing the vegetable blues to green. In solution this salt is readily recognized by adding sulphuric acid, which precipitates boracic acid in pearly crystalline scales.

THERAPEUTICAL EFFECTS.—Borax is only employed as a topical astringent ; as such it is used with benefit in aphthous ulcerations of the mouth and throat, in excessive mercurial salivation, and in some forms of chronic skin disease. (See *Diuretics*).

DOSE AND MODE OF ADMINISTRATION.—For a lotion or gargle, gr. xx. to gr. xxx. may be dissolved in f̄j. of water ; or ʒj. of the following preparation in f̄v. of water.—*Mel Boracis*, D. L. E. (Borax, in fine powder, ʒj. ; clarified honey (by weight, D.), ʒj. ; mix). The best form for applying borax to aphthous ulcerations.

INCOMPATIBLES.—The mineral acids, and most of their salts.

TORMENTILLA, L. E. *Tormentil ; Root of Potentilla tormentilla*, L. E. Indigenous ; belonging to the Natural family *Rosaceæ*, and to the Linnæan class and order *Icosandria Polygynia*.

Tormentil-root contains about 18 per cent. of tannin, and consequently is an astringent of some power, and may be used in the same cases as the other vegetable astringents. At present, however, it is scarcely ever employed, except as a domestic remedy. The dose of the powdered root is from ʒss. to ʒj., three or four times a day. The decoction is a better mode of administering it :—*Decoctum Tormentillæ*, L. (Tormentil, bruised, ʒij. ; distilled water, Oiss. Boil down to Oj. and strain). Dose, f̄j. to f̄jiss., two or three times a day. It is also an excellent astringent lotion or injection.

INCOMPATIBLES.—All substances incompatible with tannin.

UVA URSI, D. L. E. *Bearberry ; Leaves of Arctostaphylos uva-ursi*. Indigenous ; belonging to the Natural family *Ericaceæ*, and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL CHARACTERS.—A small, trailing shrub ; Leaves, obovate, entire, ever-green ; Flowers, rose-coloured, in terminal racemes ; Berry, globose, scarlet, 4-5 seeded.

PHYSICAL PROPERTIES.—The dried leaves are dark-green, shining, convex above, concave and reticulated on the under surface ; they have a very astringent, somewhat bitter taste, and emit a faint odour in the process of pulverization.

CHEMICAL PROPERTIES.—They contain 36·4 per cent of. tannin, with some gallic acid, resin, extractive, salts, &c. They yield their astringency to water, and to alcohol.

Adulteration.—The leaves of the red whortle-berry (*Vaccinium Vitis-idaea*,) and of the common box (*Buxus semper-virens*,) are often either mixed with, or substituted for uva-ursi ; the former are readily distinguished by their under surface being dotted, not reticulate ; and the latter, by their want of astringency.

THERAPEUTICAL EFFECTS.—The employment of uva-ursi as an astringent is now altogether restricted to chronic diseases of the urino-genital apparatus, attended with mucous discharge ; as in the advanced stages of catarrh of the bladder, in gleet, leucorrhœa, &c. To produce any beneficial effects its use must be persevered in for a considerable time. I have found it act very beneficially, combined with dried carbonate of soda and Dover's powder, in albuminous nephritis, where there is excessive secretion of urine.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. xx. to 3j. —*Extractum Uvæ ursi*, L. (Uva-ursi, bruised, ʒiiss. ; boiling distilled water, cong. ij ; macerate for 24 hours ; then boil down to a gallon, and strain the liquor while yet hot ; lastly, evaporate to a proper consistence). Dose, gr. v. to gr. xv. two or three times a day. —*Decoctum Uvæ ursi*, D. L. ("Take of uva-ursi leaves, bruised, half an ounce ; water, half a pint : boil for ten minutes, in a covered vessel, and strain. The product should measure about eight ounces," D. — "Uva-ursi, bruised, 3j. ; distilled water, Oiss. ; boil down to Oj. and strain," L.). Dose, f3j. to f3iij.

INCOMPATIBLES.—All substances incompatible with tannin.

ZINCI ACETAS, D. *Acetate of Zinc.*

PREPARATION.—Take of acetate of lead, one pound ; sheet zinc, four ounces ; distilled water, two pints and a half ; solution of chlorinated lime, a sufficient quantity ; dissolve the acetate of lead in the water, and, having placed the solution in a cylindric jar, immerse in it the zinc rolled into a coil. After the lapse of twenty-hours decant the liquid, and having reduced it by evaporation to fifteen ounces, drop into it, while boiling hot, the solution of chlorinated lime, until a reddish precipitate ceases to form. It is now to be cleared by passing it through a filter, then acidulated by the addition of a few drops of acetic acid, and evaporated down to ten fluid ounces, when, upon cooling, crystals will form. These, and any additional crystals obtained by the concentration of the mother liquor, should be dried on blotting-paper placed on a porous brick, and then preserved in a well-stopped bottle.

PHYSICAL PROPERTIES.—This salt occurs in small white, rhombi-

dal plates, with a pearly lustre; inodorous; having a bitter, styptic taste.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of oxide of zinc, 1 of acetic acid, and 3 of water, ($\text{Zn O}, \text{C}^4\text{H}^3\text{O}^3 + 3 \text{HO}$). Exposed to the air it effloresces slowly. It is very soluble in water and in alcohol.

THERAPEUTICAL EFFECTS.—I regard acetate of zinc as one of our best local astringents; it is especially useful in the treatment of skin diseases attended with much discharge whether serous or purulent, such as eczema, lupus, and impetigo, as soon as the acute inflammatory action which attends their first stages has been subdued. I have also found it a most excellent remedy applied in the crystalline state (as the nitrate of silver is used,) once or twice daily to lupoid ulceration, more especially when it is of the serpiginous character and is located on the scalp. Dissolved in spirit or in water, this salt is used as a topical astringent in ophthalmia, and in chronic mucous discharges. In the very commencement of the disease, or if not used then, as soon as the inflammatory symptoms have subsided, it forms an excellent injection in gonorrhœa. It has been but little employed internally, but may be used in the same cases as the sulphate.

DOSE AND MODE OF ADMINISTRATION.—Internally, gr. j. to gr. iij. made into pill with conserve of roses, or dissolved in some aqueous vehicle. For a lotion or injection, gr. ij. to gr. x. may be dissolved in f3j. of distilled water, and for an ointment from four to ten grains reduced to fine powder may be rubbed up with an ounce of wax cerate or of cold cream.—*Tinctura acetatis zinci*, (Sulphate of zinc; and acetate of potash, of each, 1 part; rub together and add 16 parts of rectified spirit; macerate for a week, frequently agitating, and filter through paper). One drachm contains a quantity of the salt nearly equal to four grains of the crystallized acetate; largely diluted with water it forms an excellent cooling, astringent lotion. This preparation has been omitted from the last edition of the Dublin Pharmacopœia.

INCOMPATIBLES.—The stronger acids; the alkalies and their carbonates; and lime water.

ZINCI CARBONAS, D. CALAMINA PRÆPARATA, L. E. *Carbonate of Zinc, D.—Prepared Calamine, L. E.*

PREPARATION.—*Dublin.*—"Take of solution of chloride of zinc, one pint; crystallized carbonate of soda of commerce, two pounds; boiling distilled water, six pints: to the carbonate of soda dissolved in the water, add the solution of chloride of zinc, in successive portions, and boil until gas ceases to be evolved. Collect the precipitate on a calico filter, and, having poured on distilled water until the washings cease to cause turbidity when dropped into a solution of nitrate of silver containing free nitric acid, dry the product, first on blotting-paper placed on a porous brick, and finally by a steam or water heat." *London, Edinburgh.*—Calamine, one of the most common ores of zinc, is an article of the *Materia Medica* in the pharmacopœias of the English and

Scotch Colleges; it is a very impure carbonate of zinc, and previously to its being used for medical purposes it is directed to be burned with a red heat, and reduced to fine powder in the same manner as prepared chalk. It then constitutes the official *prepared calamine*.

Calamine is commonly met with in the form of a heavy flesh-coloured powder: when pure, almost entirely soluble in sulphuric acid; it is generally a very impure oxide of zinc, most if not all of the carbonic acid having been driven off by the roasting. What is sold in the shops for calamine very frequently does not contain a particle of zinc, being sulphate of baryta coloured with Armenian bole. The formula of the Dublin College affords a very pure carbonate of zinc, but it is much too expensive to be generally adopted, especially for the preparation of a salt of so little value as a therapeutic agent.

Calamine is used in powder, or in the form of ointment as a mild desiccative and astringent for the treatment of intertrigo, excoriations, and superficial ulcerations. The following is the only official preparation:—*Unguentum Calaminæ*, E. *Ceratum Calaminæ*, L. ("Calamine; wax, of each, ℞ss.; olive oil, f℥xvj.; mix the oil with the melted wax; then remove them from the fire, and when first they begin to thicken, add the calamine, and stir constantly, till they cool," L.—"Calamine prepared in the same way as prepared chalk, 1 part; simple cerate, 5 parts; mix them well together," E.). This preparation, under the name of *Turner's cerate*, is in very general use, as a dessicative and healing ointment.

ZINCI OXYDUM, D. L. E. *Oxide of Zinc; Flowers of Zinc.*

PREPARATION.—*Dublin*.—"Take of carbonate of zinc, any convenient quantity: place it in a clay crucible furnished with a cover, and expose it to a very low red heat until a portion of the contents of the crucible, taken from its centre, ceases to effervesce on being dropped into dilute sulphuric acid." *London*.—"Sulphate of zinc, ℞j.; sesquicarbonate of ammonia, ℥viss.; distilled water, cong. iij.; dissolve the sulphate of zinc, and sesquicarbonate of ammonia, separately, in Oij. of the distilled water, and strain; then mix. Wash what is precipitated frequently with water; and lastly, burn it for 2 hours in a strong fire." *Edinburgh*.—"Sulphate of zinc, ℥xij.; carbonate of ammonia, ℥vj.; dissolve each in Oij. of water; mix the solutions; collect the precipitate on a cloth; wash it thoroughly; squeeze and dry it; expose it for 2 hours to a red heat."

PHYSICAL PROPERTIES.—A yellowish-white, earthy powder; inodorous and tasteless.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of zinc, and 1 of oxygen, (Zn O). When heated it becomes yellow, but regains its whiteness as it cools; at a white heat it is volatilized. Oxide of zinc is insoluble in water, but most acids dissolve it readily; from its solution in any of the acids, it is precipitated by ammonia as a white gelatinous hydrate, which is re-dissolved by an excess of the alkali.

Adulterations.—As met with in the shops, this preparation gener-

ally contains carbonate or sulphate of zinc, sometimes also lime and iron. The tests of the Edinburgh Pharmacopœia will detect these impurities:—White; tasteless; entirely soluble in dilute nitric acid; this solution is not affected by nitrate of baryta, but gives with ammonia a white precipitate entirely soluble in an excess of the test.

THERAPEUTICAL EFFECTS.—As an astringent, oxide of zinc is only employed externally in the form of powder or ointment, to slight excoriations, chapped nipples, intertrigo, superficial ulcerations, and in ophthalmia tarsi. (See also, *Tonics*.)

DOSE AND MODE OF ADMINISTRATION.—*Unguentum zinci (oxydi, ** D.) D. L. E. (Oxide of zinc, 3ij. (3j., L. E.); ointment of white wax, 3xij. (prepared lard, 3vj. L.; simple liniment, 3vj. E.); “melt the ointment with a gentle heat, and having added the oxide of zinc, mix them intimately, and stir constantly until the mixture concretes,” D.—“mix well,” L. E.)

ZINCI SULPHAS, D. L. E. *Sulphate of Zinc; White Vitriol.*

PREPARATION.—*Dublin.*—“Take of zinc laminated, or in small fragments, four ounces; oil of vitriol of commerce, three fluid ounces; distilled water, one quart; nitric acid of commerce; dilute sulphuric acid, of each, a fluid drachm; prepared chalk, two drachms. Place the zinc, oil of vitriol, and a pint of the water, in a porcelain capsule, and, when gas ceases to be developed, boil for ten minutes. Pass then the solution through a calico filter, and, having added to it the nitric acid, evaporate to dryness. Let the dry salt be dissolved in the remainder of the water, and let the solution, when cold, be shaken several times, for six hours, in a bottle with the chalk, and then cleared by passing it through a filter. It is now, after having been acidulated with the dilute sulphuric acid, to be evaporated till a pellicle begins to form on its surface, and then set to crystallize. The crystals thus obtained should be dried on blotting-paper without heat, and then preserved in a bottle. By further concentrating the solution from which the crystals have separated, an additional product will be obtained.” *London.*—“Zinc, in small pieces, 3v.; dilute sulphuric acid, Oij.; pour gradually the acid upon the pieces of zinc; and when the effervescence has ceased, strain; then boil down until a pellicle begins to form. Lastly, set aside, that crystals may be formed.” *Edinburgh.*—“It may be prepared either by dissolving fragments of zinc in diluted sulphuric acid, till a neutral liquid be obtained, filtering the solution, and concentrating sufficiently for it to crystallize on cooling—or by repeatedly dissolving and crystallizing the impure sulphate of zinc of commerce, until the product, when dissolved in water, does not yield a black precipitate with tincture of galls.”

PHYSICAL PROPERTIES.—This salt is met with in the shops, in small fragments of transparent colourless crystals, the primary form of which is the right rhombic prism; they are inodorous, but have a styptic, metallic taste.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of oxide of zinc, 1 of sulphuric acid, and 7 of water, ($\text{Zn O, SO}^3 + 7 \text{HO}$). It effloresces in dry warm air; heated it melts in its water of crystallization, which, if the temperature be increased, is all driven off, and at an intense heat it is decomposed, the acid being expelled, and the oxide of zinc left. Sulphate of zinc is soluble in $2\frac{1}{2}$ parts of temperate water, and in less than its own weight of boiling water; it is also soluble in alcohol. In the process of the Dublin College, for

preparing this salt, the nitric acid is used with the view of peroxydating any iron that may be dissolved out of the zinc, and the chalk is afterwards added, for the purpose of removing any excess of nitric acid, the nitrate of lime formed remaining in solution in the mother liquor.

Adulterations.—The only impurity of any importance met with in this salt is oxide of iron; it may be readily detected by adding ammonia to a solution of the sulphate, when a white precipitate will be produced soluble in excess of the alkali, but if any iron be present, it will not be completely redissolved.

* *THERAPEUTICAL EFFECTS.*—In large doses, unless discharged by vomiting, sulphate of zinc is an irritant poison. In small doses it acts as an astringent, and is beneficially employed as such, in chronic diarrhoea and dysentery, in excessive secretion from the bronchial tubes unaccompanied by inflammation, in fluor albus, and in gleet. As a topical remedy, it is very much employed in solution: as a collyrium in chronic ophthalmia, as a lotion in old ulcers attended with profuse discharge, and as an injection in the advanced stages of gonorrhoea, in gleet, and in leucorrhoea. (See, also, *Emetics* and *Tonics*).

DOSE AND MODE OF ADMINISTRATION.—Gr. j. to gr. v. made into pill with conserve of roses, or with some astringent extract. For external use, gr. j. to 3ss., according to circumstances, may be dissolved in f3j. of water.

INCOMPATIBLES.—Alkalies, and their carbonates; lime water; acetate of lead; nitrate of silver; astringent vegetable infusions or decoctions, and milk.

In poisoning with this salt, warm demulcent drinks, as infusion of linseed, decoction of barley, &c., should be administered to promote its evacuation by vomiting. Should inflammatory symptoms occur subsequently, they are to be combated by the usual antiphlogistic remedies.

CHAPTER V.

CATHARTICS.

(Purgatives—Evacuants.)

CATHARTICS may be defined, medicines which quicken or increase alvine evacuations. Cathartics vary much in the manner in which they produce their effects. Some act merely by exciting the muscular fibres of the intestines to increased peristaltic motion, and thus cause their contents to be more quickly and more completely evacuated. Some stimulate the mucous follicles and exhalents, so that a larger quantity of fluids than usual is excreted from the inner coat of the intestines, and thus the fecal evacuations are rendered more liquid and more copious. In many, both these properties are united; and some extend their stimulus to the neighbouring viscera also, and hence produce an increased discharge of the supplementary intestinal secretions, as the bile and pancreatic juice. Cathartics differ also as to the part of the intestinal canal on which they act; the effects of some being confined to the small, and of others to the large intestines; while many of them appear to stimulate the entire tube. They differ, moreover, as to the degree in which they produce their effects, and hence have been generally divided into three classes:—*Laxatives*, which operate so mildly as merely to produce the evacuation of the intestinal contents without causing increased secretion or stimulating any of the neighbouring viscera:—*Purgatives*, properly so called, which, besides remarkably increasing the peristaltic action of the intestines, occasion increased excretion of the fluids from the exhalent vessels, and from the neighbouring viscera, and also extend their stimulant effects to the system in general:—And *Drastic* or *Hydragogue* cathartics, which operate in the same manner as purgatives, but with much greater energy, and which, if given in an overdose, produce inflammation of the intestines, characterised by constant vomiting and purging, and intense pain. Although, for the sake of simplicity in our classification, we have arranged the remedies belonging to these three divisions under the one head, *Cathartics*; in prescribing them, due attention must be paid to the distinctions in their mode of operation, so as to fulfil the indications for which they may be administered. These distinctions will be more conveniently considered, when treating of the therapeutical effects of the individual remedies of this class. Cathartics

may be also divided into two classes, depending on the manner in which their effects are produced, that is to say, whether their operation is caused by a direct or local action on the mucous membrane of the digestive canal in the same manner as irritating or indigestible articles of food occasion diarrhœa, or indirectly by their being first taken into the circulation, as is known to occur with regard to rhubarb and other medicines of the class, which purge if injected into the veins. But this division, however scientific, it is apparent can be of but little therapeutical value. The prescriber should remember that the effect of Cathartics may be much augmented, or their operation modified, by their judicious combination, or by the addition of medicines possessing other properties, as for example, a stimulant or tonic; indeed I have been convinced by experience, that tonics are not ordered in combination with Cathartics as frequently as they ought to be; they not only augment the effect of the Cathartic, thus rendering a smaller dose of the latter necessary, but they give tone to the digestive canal, thereby removing a condition of the system on which habitual constipation is so frequently dependant.

ALOË HEPATICA, D. ALOË, L. ALOË SOCOTRINA, E. *Hepatic Aloes; Socotrine Aloes; Extract or inspissated juice, obtained from the leaves of one or more undetermined species of Aloe, D.;—Inspissated juice of the leaves of Aloë spicata, L.,—of an undetermined species of Aloë, E.*

ALOË BARBADENSIS, E. ALOË INDICA, E. *Barbadoes aloes. Indian aloes. Extract or inspissated juice of one or more undetermined species of Aloe, E.* The Dublin and Edinburgh Colleges correctly state, that aloes is obtained from various species of the genus Aloë; they are inhabitants of the East and West Indies, Socotra, Barbary, and the Cape of Good Hope; and belong to the Natural family *Liliaceæ*, and to the Linnæan class and order *Hexandria Monogynia*.

BOTANICAL CHARACTERS.—The species of the genus Aloe, from which the drug is obtained, are generally characterized by having woody stems, with large, fleshy, amplexicaul leaves, glaucous, flat above and convex below, having marginal spines or serratures; Flowers, numerous, in spikes or racemes, tubular, coloured; stamens exserted.

PREPARATION.—It is obtained by cutting the leaves transversely near their base, and evaporating the juice, which flows spontaneously from them, either in the sun or with the aid of heat; sometimes the flow of juice from the leaves is aided by plunging them in hot water; and sometimes by pressure, when an inferior sort of aloes is obtained; a still worse description is procured by evaporating a decoction of the leaves.

PHYSICAL PROPERTIES.—Obtained in these different ways, and

from various parts of the world, aloes differs much in its physical properties, consequently several varieties of the drug are met with in commerce. In addition to the three kinds admitted by the Edinburgh College, I will describe a fourth, *Cape aloes*: the Dublin College apparently includes the two first varieties under the term Hepatic Aloes.—1. Socotrine aloes (*Aloë Socotrina*), is named from its being found in the island of Socotra, whence it is imported into England either by way of Smyrna or Bombay; it is in masses of a golden-brown colour, having a smooth, glassy fracture, and a translucent garnet-red hue at the edges; the odour is fragrant and aromatic, much heightened by being breathed on, and the taste is bitter; it yields a powder of a beautiful golden-yellow colour which is almost entirely soluble in proof spirit. The following are the characters assigned to Socotrine aloes by the Edinburgh Pharmacopœia; “In thin pieces, translucent and garnet-red, almost entirely soluble in spirit of the strength of sherry. Very rare.” Socotrine aloes is most probably procured from the *Aloë Socotrina*, it is imported in skins or in chests.—2. East Indian aloes (*Aloë Indica*, E.), is usually confounded, at least in Ireland, with the foregoing variety. It occurs in large opaque masses, of a dark liver-brown colour, with a dull, waxy, fracture; the odour is similar to, but weaker than that of Socotrine aloes, and the taste equally bitter; it yields a dull reddish-yellow powder, a great part of which is insoluble in proof spirit. It is brought to England in skins and chests from Bombay, but it is stated to be originally obtained from the coasts of the Red Sea. It is probably obtained from a species of aloë if not identical with, nearly allied to, the *Aloë Socotrina*.—3. Barbadoes aloes (*Aloë Barbadosensis*, E.), is a product of Barbadoes, Jamaica, and other West India islands, whence it is imported in gourd-shells, occasionally in boxes. It is of a dark liver-brown, sometimes almost black colour; the fracture is dull and opaque, the odour strong and disagreeable, resembling that of the human axilla, and the taste very bitter. It is reduced to powder with difficulty, the powder being of a dull dark-yellow colour. This variety is obtained from the *Aloë vulgaris*, and probably from some allied species.—4. Cape aloes (*Aloë Capensis*), is imported in skins and in chests from the Cape of Good Hope, and is very common in English commerce, although not introduced into any of the pharmacopœias. It is of a glossy resinous appearance, a dark brown colour, with a greenish yellow shade, especially when in small fragments, a strong disagreeable odour much increased by breathing on it, and an acrid bitter taste; it is very brittle, and readily reduced to powder, which is of a shining, greenish-yellow colour. It is procured from the *Aloë spicata* and several other allied species.

CHEMICAL PROPERTIES.—The most important constituent of aloes is a bitter extractive matter (*Aloësin*, Pfaff, *Aloïne*, Mesmer,) amounting in the finer sorts to nearly 80, in the inferior to about 50 per cent; it is probably the active principle of the drug. The finer sorts of aloes contain also resin and a peculiar acid (*Aloëtic acid*,

Pereira); in addition to these substances, the inferior sorts contain some vegetable albumen. Aloes is almost completely soluble in boiling water, but as the water cools a dark brown substance, insoluble in cold water, is deposited; it is very sparingly soluble in rectified spirit, but dissolves almost entirely in proof spirit, and still more readily in weaker spirit; heated, it fuses imperfectly, and if the heat be continued is converted into a resinous-looking, very friable mass.

Adulterations.—The only adulteration of aloes is, the mixing the inferior sorts with, or substituting them for, the finer kinds; of this we can judge by the physical characters, particularly the odour when breathed on, or by the solubility in weak spirit.

THERAPEUTICAL EFFECTS.—In moderate doses, from three to ten grains, aloes acts as a stimulating cathartic, influencing especially the large intestines, on which it operates rather by exciting their peristaltic action, than causing increased secretion from their mucous membrane. It produces its effects more slowly than most other medicines of this class, from ten to eighteen hours usually elapsing before it operates. The specific action of aloes on the large intestines contraindicates its employment in hemorrhoidal affections, in irritation or inflammation of the pelvic viscera, the prostrate gland or the urethra, in pregnancy or during the menstrual discharge. From its mode of operation it is also evidently not adapted for cases in which we wish to produce increased secretion from the intestinal canal, or where a speedy operation is required. The employment of aloes as a purgative, is, nevertheless, very general, and perhaps there are few vegetable cathartics more extensively used, as may be judged from the numerous officinal formulæ for its administration which are contained in the British pharmacopœias. In torpor of the intestines, especially when accompanied by deficient secretion of bile, it is the most useful of this class of remedies; indeed it appears to be the best substitute for that secretion, and is therefore exhibited with the most beneficial results in jaundice when unaccompanied by hepatic inflammation, mechanical obstruction of the ducts, &c. In habitual costiveness so common in females, aloes is also administered with much benefit, due attention being paid to the circumstances which contraindicate its employment. Christison states, that the cathartic property of aloes is much increased by its combination with sulphate of iron, and that its irritating action on the rectum is counteracted by combining it with extract of hyoscyamus; both of which statements my experience fully confirms.

DOSE AND MODE OF ADMINISTRATION.—*Aloë hepatica*, D. *Aloë Socotrina*, L.E. *Aloë Indica*, E. Gr. iij. to gr. xv.—*Aloë Barbadosensis*, E. Gr. ij. to gr. v. It is best administered in the form of pill, made with honey, mucilage, &c.—*Extractum Aloës aquosum*, D. *Extractum Aloës purificatum*, L. ("Take of hepatic aloes, in coarse powder, four ounces; water, two pints. Boil the aloes until it is dissolved; when the solution is cold and the dregs have subsided, pour off the clear liquid, and evaporate it to a proper consistence,"

D.—“Aloes, powdered, $\bar{3}xv.$; boiling water, cong. j.; macerate for three days with a gentle heat; strain, allow the feces to subside; pour off the clear liquor, and evaporate to a proper consistence,” L.). Dose, gr. v. to gr. xv.; this is a useless preparation when we can obtain good aloes.—*Pulvis Aloës compositus*, L. (Socotrine aloes, $\bar{3}iss.$; guaiacum resin, $\bar{3}j.$; compound cinnamon powder, $\bar{3}ss.$; rub the aloes and guaiacum separately to powder, and mix in the cinnamon powder). A stimulating cathartic not much used. Dose, gr. x. to $\bar{3}j.$ —*Pilulæ Aloës*, E. (Socotrine aloes; and Castile soap, of each, equal parts; conserve of red roses, q. s.; beat into a proper pill mass. This pill may also be correctly made with the finer qualities of East Indian aloes, as the Socotrine variety is very scarce; and many prefer, not without reason, the stronger Barbadoes aloes). Dose, gr. x. to $\bar{3}ss.$ —*Pilulæ Aloës compositæ*, D. L. (“Take of hepatic aloes, in powder, two ounces; extract of gentian, one ounce; oil of caraway, one fluid drachm; treacle, *by weight*, one ounce. Beat them together until they are thoroughly incorporated,” D.—“Socotrine aloes, powdered, $\bar{3}j.$; extract of gentian, $\bar{3}ss.$; oil of caraway, min. xl.; simple syrup, a sufficiency; mix,” L.) An excellent habitual purgative. Dose, gr. v. to gr. xv.—*Pilulæ Aloës cum Myrrhâ*, D. L. E. (“Take of hepatic aloes, in powder, two ounces; myrrh, in powder, one ounce; dried saffron, in powder, half an ounce; treacle, *by weight*, two ounces and a-half. Triturate the aloes, myrrh, and saffron together, and sift them; then add the treacle, and beat all the ingredients into a uniform mass, D.”—“Socotrine (Socotrine or East India, E.) aloes, (powdered, L.), $\bar{3}ij.$ (4 parts, E.); saffron, $\bar{3}j.$ (1 part, E.); myrrh, $\bar{3}j.$ (2 parts, E.); syrup (conserve of red roses, E.), a sufficiency; beat to a proper mass,” L. E.) *Rufus’ Pills*. An excellent stimulating cathartic and emmenagogue. Dose, gr. x. to gr. xx.—*Pilulæ Aloës et Assafœtidæ*, E. (Socotrine or East Indian aloes; assafœtida; and Castile soap, equal parts; conserve of red roses, q. s.; beat to a proper mass). Cathartic and antispasmodic. Dose, gr. x. to gr. xv.—*Pilulæ Aloës et Ferri*, E. (Sulphate of iron, 3 parts; Barbadoes aloes, 2 parts; aromatic powder, 6 parts; conserve of red roses, 8 parts; pulverise the aloes and sulphate of iron separately, and beat into a proper mass, which is to be divided into five grain pills). Tonic and cathartic, well adapted for chlorosis. Dose, one to three daily.—*Pilulæ ante cibum*, Paris Codex. (Aloes, 6 parts; extract of cinchona, 3 parts; canella, 1 part; syrup of wormwood, q. s.; divide into four grain pills). One or two before dinner.—*Decoctum Aloës compositum*, D. L. *Decoctum Aloës*, E. (“Take of hepatic aloes, in powder, one drachm and a-half; myrrh, in powder; saffron, chopped fine, of each, one drachm; pure carbonate of potash, two scruples; extract of liquorice, half an ounce; water, fourteen ounces; compound tincture of cardamoms, as much as is sufficient. Rub the aloes, myrrh, and carbonate of potash together, then add the saffron and extract of liquorice, and boil for ten minutes, in a covered vessel; cool, strain through flannel, and add of compound tincture of cardamoms as much as will make six-

teen fluid ounces," D.—"Extract of liquorice, ʒss. (3vij., L.); carbonate of potash, ʒij. (3j., L.); Socotrine (or hepatic, E.) aloes, bruised (powdered, L.); myrrh, bruised (powdered, L.); and saffron, of each, ʒj. (ʒiss. L.); water, Oiss. (f3xvj. E.); boil together down to f3xij. (Oj., L.), strain and add of the compound tincture of cardamoms, f3iv. (f3vij. L.," L. E.) A mild cathartic with tonic properties: Acids, acidulous and most metallic salts are incompatible in prescription with it. Dose, f3ss. to f3ij.—*Vinum Aloës*, L. (Socotrine aloes, rubbed to powder, ʒij.; canella bark, powdered, ʒiv.; sherry wine, Oij.; macerate for fourteen days with frequent agitation and strain).—E. (Socotrine or East Indian aloes, ʒiss.; cardamom seeds, ground; and ginger in coarse powder, of each, ʒiss.; sherry, Oij.; digest for seven days, and strain through linen or calico). A warm purgative. Dose, f3ss. to f3j.—*Tinctura Aloës*, L. E. (Socotrine (or East Indian, E.) aloes, powdered, ʒj.; extract of liquorice, ʒiij.; rectified spirit, Oss., (f3xij., E.); water, Oiss., (f3xxvij., E.); digest for seven (fourteen, L.) days and filter). Cathartic and tonic. Dose, min. xxx. to f3ss.—*Tinctura Aloës composita*, L. *Tinctura Aloës et Myrrhæ*, E. (Socotrine (or East Indian, E.) aloes, powdered, ʒiv.; tincture of myrrh, Oij.; saffron, ʒij.; macerate for fourteen (seven, E.) days and filter). Stomachic and cathartic. Dose, f3ss. to f3ij.—*Enema Aloës*, L. (Aloes, ʒij.; carbonate of potash, gr. xv.; decoction of barley, Oss.; mix and rub them together). A useful stimulating cathartic in the constipation of amenorrhœa; also employed for dislodging ascarides from the rectum.

CALOMELAS, D. E. *vel* CALOMELAS SUBLIMATUM, D. HYDRARGYRI CHLORIDUM, L. *Calomel*; *Sublimed Calomel*; *Chloride of Mercury*. (*Subchloride of Mercury*, Graham).

PREPARATION.—CALOMELAS SUBLIMATUM, D. "Take of sulphate of mercury, ten pounds; mercury of commerce, seven pounds; dried chloride of sodium, five pounds. Incorporate as completely as possible the sulphate and the metallic mercury by prolonged trituration, and, having then added the chloride of sodium previously reduced to a fine powder, rub all well together until a perfectly equable mixture is obtained. Heat this, through the medium of sand, in a shallow iron pot with a flat bottom, lined with clay, and covered with a lid of cast iron, until the sublimate which attaches itself to a circular plug in the centre of the lid (which admits of being removed and cleaned from time to time,) neither exhibits minute globules of mercury, nor is rendered yellow by being touched with a solution of caustic potash. The whole being now permitted to cool down to the temperature of the air, the contents of the pot are to be transferred to a small hot-hearth or oven, whose door is made tight by a clay lute, and a regulated heat is to be applied so as to cause the vaporized calomel to pass into an adjacent chamber of considerable size, on the floor of which it will accumulate in the form of a fine white powder."—HYDRARGYRI CHLORIDUM, L. "Mercury, lbiv.; sulphuric acid, lbij.; chloride of sodium, lbiss.; distilled water, a sufficiency. Boil lbij. of the mercury with the sulphuric acid in a proper vessel, until a bipersulphate of mercury remains dry; rub this when it is cold with lbij. of mercury in an earthen mortar, that they may be perfectly mixed. Afterwards add the chloride of sodium, and rub them

together until globules are no longer visible ; then sublime. Rub the sublimate to very fine powder, and wash it carefully with boiling distilled water, and dry it."—CALOMELAS, E. "Mercury, ℥viij. ; sulphuric acid, f℥ij. f℥iij. ; nitric acid, f℥ss. ; muriate of soda, ℥iij. ; mix the acids, add to them ℥iv. of the mercury, and dissolve it with the aid of a moderate heat ; raise the heat so as to obtain a dry salt. Triturate this with the muriate of soda and the rest of the mercury, till the globules entirely disappear ; heat the mixture by means of a sand-bath in a proper subliming apparatus. Reduce the sublimate to fine powder ; wash the powder with boiling distilled water until the water ceases to precipitate with solution of hydriodate of potash ; and then dry it.

PHYSICAL PROPERTIES.—Calomel as obtained by sublimation, is sometimes in the form of a semitransparent, white, crystalline cake, the crystals being four-sided prisms ; as usually met with, however, it is a heavy, snow-white, soft powder, inodorous and tasteless. Its specific gravity is 7.14 (Boullay).

CHEMICAL PROPERTIES.—Calomel is a subchloride of mercury, being composed of one equivalent of chlorine, and 2 of mercury (Hg^2Cl). It is completely insoluble in cold or boiling distilled water, in alcohol, or in ether. It acquires a yellow tinge by exposure to the air, or by rubbing ; exposed to heat it becomes yellow, and volatilizes at a heat below redness, if under pressure it fuses ; with lime water it gives a blackish precipitate, *sub-oxide* of mercury.

Adulterations.—Calomel sometimes contains corrosive sublimate, which may be detected by agitating with sulphuric ether, pouring off the clear liquid and evaporating ; if any sublimate be present, a crystalline powder is left, which becomes yellow with solution of caustic potash ; this adulteration I have repeatedly detected in calomel, my attention having been first directed to it by the irritation which it produced when administered to patients ; one patient to whom calomel thus adulterated was given in the form of powder, complained of a burning sensation in the back of the mouth and pharynx. The presence of any fixed white powder may be detected by applying a sufficient heat to sublime the calomel. The London College proposes the following additional tests for its purity :— "Nitrate of silver, lime water or hydro-sulphuric acid, added to distilled water, with which it has been washed or boiled, causes no precipitate."

THERAPEUTICAL EFFECTS.—Calomel is seldom employed alone as a cathartic, but combined with other remedies of this class it is very frequently used, chiefly in consequence of its action on the secreting organs, stimulating the liver and intestinal glands to increased activity. It is therefore peculiarly adapted for all diseases attended with functional derangement of the hepatic system ; as well as for those cases in which there is determination of blood to the vessels of the brain, as in some forms of chronic head-ache, in threatened apoplexy, and paralysis, &c. It is also used with much benefit as a purgative in the early stages of inflammatory diseases and of fevers, more especially in the fevers of warm climates, in which it is generally given in very large doses, from 15 to 30 grains, its cathartic action not being increased in proportion to the dose. Calomel is well suited as

a cathartic for children, being tasteless, and in general producing copious alvine evacuations without pain; here also its combination with other purgatives, as jalap or scammony, will be attended with benefit. In verminous diseases it is the best purgative that can be employed, as it not only dislodges the worms from the intestines, but also acts as a poison to them. (See, *Special Stimulants*).

DOSE AND MODE OF ADMINISTRATION.—In powder or pill, from gr. ij. to gr. vj.—*Pilulæ catharticæ composita*, U. S. (Calomel, ʒiij., compound extract of colocynth, in powder, ʒss., extract of jalap, in powder, ʒiij., gamboge, in powder, gr. xl.; form them into a mass with water and divide into 180 pills). An excellent purgative, combining efficiency of action and comparative mildness with smallness of bulk. Each pill contains one grain of calomel; Dose, one or two pills.—*Pilulæ purgantes cum mercurio*, DEN. (Calomel, four parts; extract of rhubarb, eight parts; resin of jalap, one part; oil of orange peel, q. s.; mix). Dose, gr. ij. to gr. viij.

INCOMPATIBLES.—The alkalies, and their carbonates; chloride of sodium; lime water; nitric and muriatic acids; iodide of potassium; sulphuretted hydrogen, and its combinations; soaps, &c.

CAMBOGIA, (SIAMENSIS,) E. CAMBOGIA, L. *Siam gamboge*.—*Gum-resin of Stalagmitis Cambogioides*, L.—From an unascertained plant inhabiting Siam, probably a species of *Hebradendron*, E.

CAMBOGIA, D. CAMBOGIA, (ZEYLANICA), E. *Ceylon gamboge*; *Gum-resinous exudation of Hebradendron gambogioides*. The plant which yields commercial or Siam gamboge is not yet ascertained; it is conjectured by the Edinburgh College, to be a species of *Hebradendron* nearly allied to the *Hebradendron gambogioides*, from which plant Ceylon gamboge is procured; but more recent investigations tend to prove that it is the produce of the *Garcinia cochinchinensis*. The gamboge of medicine is erroneously ascribed by the Dublin College to the Ceylon gamboge tree. It belongs to the Natural family *Guttifera* (*Clusiaceæ*, Lindley), and to the Linnean class and order *Monœcia Monadelphica*.

BOTANICAL CHARACTERS.—A handsome tree of moderate size, with opposite, stalked, leaves; unisexual flowers, sessile and axillary; and a pleasant, saccharine fruit, about the size of a cherry, four celled, each cell one seeded.

PREPARATION.—In Ceylon, gamboge is procured by making incisions into the bark of the tree or removing a piece of it, whence, a viscid, bright-yellow juice exudes, which, when dried by exposure to the sun in shallow bowls, concretes into a hardened mass. In Siam it is said to be obtained by breaking across the young branches and leaves, and collecting the juice that drops from them; be this as it may, the finer qualities are allowed to dry in the hollow stems of the bamboo-cane, or probably the juice is collected in them; and of late it has been commonly imported in the reeds.

PHYSICAL PROPERTIES.—Commercial or Siam gamboge is generally met with in two forms; that of cylinders, sometimes hollow, more frequently solid—*Pipe Gamboge*; and in irregular shaped

masses—*Cake or Lump Gamboge*. Pipe gamboge is of a rich, reddish yellow colour, generally greenish and dusty externally; inodorous, tasteless at first, but soon causing a sense of acidity in the throat; brittle, with a smooth, glistening, conchoidal fracture. Lump gamboge is of a duller colour, its fracture is splintery, with scarcely any lustre, and it contains small fragments of wood, and many air-vesicles. *Ceylon Gamboge*, (for a specimen of which I am indebted to my friend, Professor Christison), is not an article of English commerce; it is a coarse looking substance with numerous air-vesicles, of a dull reddish-yellow colour with many dark-brown spots.

CHEMICAL PROPERTIES.—Gamboge is composed of resin (*Gambogic acid*), soluble gum, and a trace of woody fibre; the proportion of the resin, which is the active principle, varies, according to several of Christison's analyses, from 68 to 75 per cent. Gamboge, although not soluble in water, forms a perfect emulsion with it; it is almost entirely soluble in rectified spirit, and sulphuric ether completely dissolves out the resin, leaving the gum.

Adulterations.—The inferior varieties of gamboge are adulterated with some amylaceous matter, they also generally contain lignin; the former is detected by a cooled decoction becoming greenish on the addition of tincture of iodine, and the presence of the latter may be known by the fracture not being smooth and conchoidal.

THERAPEUTICAL EFFECTS.—Gamboge is a drastic cathartic, producing even in small doses frequent and copious watery evacuations, attended with much irritation of the stomach and bowels; in somewhat larger doses it occasions vomiting and even sometimes inflammation of the intestinal canal, followed by death; a single drachm has proved a fatal dose in more than one instance, the post-mortem appearances being ulceration and mortification of the intestines. In consequence of the distress caused by even medicinal doses of gamboge, it is seldom employed alone as a purgative, but is frequently added to other remedies of this class, either to augment their power, or to produce increased secretion from the alimentary canal. It is chiefly used as a cathartic in dropsical affections, for which it is well adapted, as it both causes a large discharge of serum from the intestines, and stimulates the kidneys to increased action. The combination of gamboge with an alkali, as with carbonate of potash, acts as a diuretic of much power, and such a preparation under the name of *tincture of gamboge* is highly praised by many continental authors. The resin of gamboge in somewhat smaller doses acts precisely similar to the drug itself.

DOSE AND MODE OF ADMINISTRATION.—In powder, pill, or emulsion, gr. ij. to gr. v. which may be repeated every five or six hours until it operates; it should be always finely powdered and combined with some comparatively inert substance, as sugar, sulphate of potash, or cream of tartar.—*Pilulæ Cambogiæ compositiæ*, L. (Gamboge, powdered, ʒj.; aloes ʒiiss.; ginger, powdered, ʒss.; soap, ʒij.; mix the powders together, add the soap, and beat them into a mass.)

A useful cathartic combination, operating effectually in doses of from gr. x. to gr. xx.—*Pilulæ Gambogiæ*, E. (Gamboge; East Indian or Barbadoes aloes; and aromatic powder, of each, one part; Castile soap, two parts; pulverize the aloes and gamboge separately, mix all the powders, add the soap, and with the aid of syrup beat into a proper pill mass); Properties and dose same as last.—*Tinctura Gambogiæ*, VOIGTEL. (Gamboge, powdered, ʒss.; carbonate of potash, ʒj.; brandy, fʒxij.; mix the powders intimately, add the spirit and digest for four days with a gentle heat). An excellent diuretic. Dose, fʒss. to fʒj.

In cases of poisoning with gamboge, emollient and demulcent drinks should be given, and similar enemata administered; to be followed by small but repeated doses of opium, blood-letting, and the warm bath.

CASSIÆ PULPA, E. CASSIA, L. *Cassia pulp.* *Pulp of the pods of Cassia fistula.* This tree, originally a native of Africa, is now generally diffused over the East and West Indies; it belongs to the Natural family *Leguminosæ* (*Fabacæ*, Lindley), and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL CHARACTERS.—A handsome tree, about thirty feet in height; with alternate, pinnate, leaves; bright yellow papilionaceous flowers in racemes; and cylindrical legumes or pods, about one or two feet long, of a blackish-brown colour.

PREPARATION.—The pulp of the pods is the part employed in medicine. It is usually prepared by pouring water on the bruised pods, so as to wash out the pulp, pressing through a sieve, and evaporating the solution thus obtained to the consistence of a thick extract.

PROPERTIES.—Cassia pulp is of a reddish-black colour, and has a sweetish mucilaginous taste, but no odour. It consists of sugar, gum, mucilaginous extractive, and colouring matter; no principle possessing purgative properties has as yet been discovered in it. It is almost entirely soluble in both alcohol and water.

Adulterations.—The pulp is not liable to adulteration; those pods only should be chosen, which are heavy, and in which the seeds do not rattle.

THERAPEUTICAL EFFECTS.—Cassia pulp is a mild laxative, at present but seldom employed; it is only adapted for febrile or inflammatory affections occurring in persons of delicate habit or in children. Combined with manna, its cathartic properties are said to be much increased.

DOSE AND MODE OF ADMINISTRATION.—Of the pulp ʒss. to ʒij.—*Confectio Cassiæ*, L. (Cassia pulp, lbss.; manna, ʒij.; tamarind pulp, ʒj.; syrup of roses, lbss.; bruise the manna and dissolve it in the syrup, then add the pulps and evaporate to a proper consistence). Dose ʒij. to ʒj.

COLCHICI CORMUS ET SEMINA, E. L. COLCHICUM AUTUMNALE, D.—*The cormus and seeds of Colchicum autumnale. Meadow-saffron.* A common indigenous plant, belonging to the Natural family *Melanthaceæ*, and to the Linnæan class and order *Hexandria Trigynia*.

BOTANICAL CHARACTERS.—Cormus (improperly called bulb), fleshy, covered with a loose, brown, membrane; giving origin in the middle of summer to a young cormus, which remains attached to the parent, grows rapidly, and sends up in autumn a naked white tube or flowering stem, terminating in a pale purple, crocus-like flower; the flower soon dies; and the seed vessel which remains under ground, springs up with the erect, broadly lanceolate leaves, in the ensuing February or March.

PREPARATION.—The cormus should be gathered about the end of July or beginning of August, before the flowering stem is sent up; for medical purposes, it is cut transversely into thin slices, the dry coats having been previously removed; the slices are dried in a dark place, exposed to the air, with a heat not exceeding 170°. Mr. Houlton states that the colchicum cormus, when dried entire, retains its active properties much more perfectly, and for a much longer period than if it is sliced. He also recommends it to be dried without artificial heat, which he says may be readily done by stripping off the loose dry coats, and carefully removing the young bud or bulb. The seeds are gathered when ripe.

PHYSICAL PROPERTIES.—Colchicum cormus is ovoid, about the size of a large walnut, compressed on one side, convex on the other; it may be distinguished from bulbous roots by being solid, and not composed of laminae or scales. The dry slices are of a grayish-white colour, and firm. The seeds are small, rough, nearly round, and of a blackish-brown colour. Both seeds and cormus are odourless, but have a bitter, acrid taste. The flowers, both in their fresh and dried state, have been occasionally employed, but they are not so certain in their effects as either the seeds or cormus.

CHEMICAL PROPERTIES.—The cormus consists of fatty matter, a volatile acid, a peculiar uncrystallizable alkaloid named *veratria* (which will be described under the head of General Stimulants) combined with gallic acid, starch, gum, inulin, and lignin (Pelletier and Caventou). A crystallizable alkaloid, *Colchicia*, was discovered in the seeds by M. M. Hesse and Geiger; it bears much resemblance to *veratria* with which it was at first supposed to be analagous; it is bitter, very poisonous, but neither acid nor sternutatory, and soluble in water, alcohol, and ether. The active principles are extracted by water, alcohol, vinegar, and wine.

Adulterations.—From having been gathered at an improper season, or from careless drying or preservation, colchicum cormus is in general nearly inert. When good the dried slices are firm, and notched only on one side; and a fresh-scraped surface, moistened with vinegar, and tincture of guaiacum dropped on it, is turned blue.

THERAPEUTICAL EFFECTS.—The most constant effect, indeed, in general, the only manifest one, of colchicum is purging; its cathartic operation being accompanied by great depression of the circulation and much debility. In large or frequently repeated doses it produces nausea, vomiting, or hypercatharsis; and in small doses it is held by many to be diuretic, but this effect is uncertain. Under

its use, the quantity of uric acid in the urine is very much augmented. The principal diseases in which colchicum has been employed are gout and rheumatism; for the former of which, it has acquired the character of being a specific. Administered during a paroxysm of gout, it seldom fails to alleviate the pain and cut short the fit, yet its beneficial effect is more decidedly manifested if it be not administered until the violence of the fit is over; but so far from preventing a return of the attack, most practitioners agree that the employment of colchicum renders the system more predisposed to the disease, indeed, frequently gives rise to irregular or atonic gout. In acute rheumatism, the employment of colchicum requires the greatest caution, and is very seldom admissible; but in some of the chronic forms of the disease, especially gouty rheumatism, it is often used in robust constitutions with benefit. Owing to its effects on the secretion of uric acid, it is employed with the best possible effect in diseases of the urinary organs in which oxalate of lime is present in the urine. Colchicum has been also employed as a cathartic and diuretic in dropsy, and as an antiphlogistic in febrile and inflammatory diseases; but in the present day its use is almost entirely confined to gout and rheumatism.

DOSE AND MODE OF ADMINISTRATION.—In the administration of colchicum or any of its preparations, we should always begin with small doses and increase them very gradually, as no medicine varies more in its action on different persons, and besides the pharmaceutical preparations differ much in activity. It is seldom used in the form of powder, the dose is from gr. ij. to gr. viij.; the powder of the seeds should be preferred to that of the cormus, as being more uniform.—*Acetum Colchici*, D. L. E.—(“Take of colchicum bulbs, dried and bruised, one ounce; acetic acid of commerce (sp. gr. 1044), four fluid ounces; distilled water, twelve ounces: in the acid, diluted with the water, macerate the colchicum, in a close vessel, for seven days; then strain with expression, and filter,” D.—“Fresh colchicum cormus, sliced, ʒj.; distilled vinegar, fʒxvj.; proof spirit fʒj.; macerate the colchicum in the vinegar for three days in a covered glass vessel; press, strain, and set aside that the dregs may subside; add the spirit to the clear liquor,” L. E.). This preparation is preferred by Scudamore to any other for gout, he recommends magnesia to be combined with it, to saturate the acid. It is, however, of very uncertain strength, in consequence of being frequently prepared with the dried bulb; and for this reason the formula of the last edition of the Dublin Pharmacopœia is a bad one. Dose, fʒss. to fʒij., frequently repeated.—*Extractum Colchici (cormi)*, L. (Fresh colchicum cormus, ℥j.; bruise with a little water in a stone mortar, press out the juice and evaporate it unstrained, to a proper consistence). Dose, gr. j., every three or four hours; not much used.—*Extractum Colchici (cormi) aceticum*, D. L. E. (“Take of colchicum root, dried, four ounces; dilute acetic acid, eight fluid ounces: Digest the root in the acid for fourteen days, then filter, and evaporate by means of a water bath, to the consistence of a soft extract,” D.—

"Fresh colchicum cormus, ℥j.; acetic (pyroligneous, E.) acid, fʒiij.; bruise the cormus, gradually adding the acid, express the juice, and evaporate it in a porcelain vessel not glazed with lead, (over the vapour bath, E.), to a due consistence," L. E.). Dose, gr. j. to gr. iij., two or three times a day. Made into pill with an equal quantity of extract of colocynth, it forms an excellent cathartic in gouty and rheumatic affections. In this preparation also the Dublin College has directed the dry cormus to be employed, and therefore it cannot be depended on.—*Tinctura Colchici seminum*, D. L. E. (Colchicum seeds, bruised (ground finely in a coffee mill, E.), ʒv.; proof spirit, Oij.; "macerate for 14 days (strain, L.), strain, express and filter," D. L., "to be prepared like tincture of cinchona, and percolation is much more convenient and speedy than digestion," E.). Dose, fʒj. gradually increased to fʒij., twice daily.—*Tinctura Colchici composita*, L. (Colchicum seeds, bruised, ʒv.; aromatic spirit of ammonia, Oij.; macerate for 14 days and strain). Dose, min. xx. to min. xxx., three times a day; seldom used.—*Vinum Colchici*, L. E. (Colchicum cormus, dried and sliced, ʒviij.; sherry wine, Oij.; digest for 14 (7, E.) days, (express strongly the residuum, E.), and strain). It may be prepared with the seeds (*Vinum seminum Colchici*), using the same proportions, a preferable preparation as being more uniform; Dose, fʒss., gradually increased to fʒij., three or four times a day.—*Succus Colchici* is prepared by expressing the juice from fresh cormi, allowing it to stand 48 hours to deposit the fecula, and adding to the clear liquor a fifth part of rectified spirit. This is a most active preparation, and keeps well. Dose, min. v. to min. xx.

INCOMPATIBLES.—Acids; tincture of iodine; tincture of guaiacum; and all astringent vegetable infusions and decoctions.

In cases of poisoning with colchicum, emetics followed by demulcent drinks should be immediately administered; and if coma be present, brandy, ammonia, coffee and other powerful stimulants should be given. The vegetable astringents have been recommended as antidotes, tannic acid forming an insoluble precipitate with veratria.

COLOCYNTHIS, D. L. E. *Colocynth*. *Pulp* (dried, L.) of the fruit of *Cucumis colocynthis*. This plant, the bitter cucumber, is a native of several parts of Asia and Africa, and is cultivated in Greece and Spain; it belongs to the Natural family *Cucurbitaceæ*, and to the Linnæan class and order *Monœcia Syngenesia*.

BOTANICAL CHARACTERS.—A creeping, procumbent, annual; Leaves ovato-cordate; Flowers, yellow, axillary, solitary; Fruit (*pepo*), globose, about the size of an orange, yellow when ripe, with a thin solid rind.

PREPARATION.—The fruit is gathered when ripe, peeled and dried. In some countries it is dried without being peeled.

PHYSICAL PROPERTIES.—The pulp of the dried fruit, which is the officinal part, is of a pale yellowish-white colour; it is without odour, but has an intensely bitter, nauseous taste; it is light, spongy,

porous, and so tough as to be with difficulty reduced to powder. The unpeeled fruit (*Mogadore Colocynth*), is imported in small quantities into England, but is only used by druggists for show-bottles.

CHEMICAL PROPERTIES.—Colocynth pulp contains a peculiar bitter principle, which has been named *Colocynthin*, and on which its purgative property is supposed to depend, resin, pectin, gummy matter, and various salts. It yields its active properties to both water and alcohol.

Adulterations.—Colocynth pulp is not liable to adulteration; but if it be of a greyish or brownish colour, it is of inferior quality.

THERAPEUTICAL EFFECTS.—Colocynth operates as a stimulant to the intestinal canal, its influence being specially directed to the large intestines, promoting their secretions as well as increasing their vermicular motion; in large doses it is a dangerous poison, producing intestinal inflammation. In consequence of the drastic properties it possesses when administered alone, it is always combined with other cathartics in order to mitigate its action, as in the several pharmacopœial preparations, and is thus exhibited with much advantage in habitual constipation, in passive dropsies, in alvine obstruction, and as a revulsant in determination of blood to the brain. It is also said to possess diuretic properties.

DOSE AND MODE OF ADMINISTRATION.—In powder (now seldom used), gr. ij. to gr. viij. mixed with some inert powder. Powdered colocynth if sprinkled over a blistered surface acts as a cathartic as actively as if administered by the mouth, and it may be used with advantage in this way in apoplexy and other diseases in which the patient is unable or unwilling to swallow. Its use must not, however, be pushed too far, as if it does not purge, it is apt to cause inflammation of the intestines.—*Extractum Colocynthis*, L. E. (Colocynth pulp, ℥j.; water, (distilled, L.), cong. ij.; boil for six hours gently, replacing the water occasionally; strain while hot, and evaporate (in the vapour bath, E.) to a proper consistence). A bad preparation as it does not keep well; but seldom used; Dose, gr. v. to ℥j.—*Extractum Colocynthis compositum*, L. (Colocynth pulp, cut small, 3vj.; purified extract of aloes, 3xij.; scammony, powdered, 3iv.; cardamom seeds, powdered, 3j.; soap, 3iij.; proof spirit, cong. j.; macerate the colocynth in the spirit for four days with a gentle heat; add the aloes, scammony, and soap to the strained liquor; then evaporate to a proper consistence, the cardamom seeds being mixed in towards the end). One of the most generally employed, and safest cathartics in the whole *Materia Medica*, and if the various substances of which it consists be pure, equally efficacious as safe. It has been omitted from the last Dublin Pharmacopœia as its composition so nearly resembled the compound colocynth pill. Dose, gr. v. to gr. xv.—*Pilulæ Colocynthis*, E. (Socotrine or Indian aloes; and scammony, of each, 8 parts; colocynth, 4 parts; sulphate of potash; and oil of cloves, of each, 1 part; rectified spirit, a sufficiency; pulverise the aloes, scammony, and sulphate together, mix the colocynth in fine powder, add the oil, and with the aid of a little

spirit, beat into a proper pill mass).—*Pilulæ Colocynthis composita*, D. (Take of pulp of colocynth, in fine powder, one ounce; hepatic aloes, in fine powder, two ounces; scammony, in fine powder; castile soap, of each, one ounce; oil of cloves, one fluid drachm; treacle, *by weight*, ten drachms: reduce the soap to a fine powder, and mix it with the colocynth, aloes, and scammony; then rub all together with the oil of cloves and treacle, and beat them into a mass of a uniform consistence). Both these preparations resemble in their operation the compound extract, to which I think they are to be preferred, the dose is the same.—*Pilulæ Colocynthis et Hyoscyami*, E. (Colocynth pill mass, 2 parts; extract of hyoscyamus, 1 part; beat well together, adding a few drops of rectified spirit if necessary; and divide into five grain pills). An excellent preparation, peculiarly adapted for persons with irritable bowels. Dose, 1 to 3 pills.—*Enema Colocynthis*, L. (Compound extract of colocynth, ʒij.; soft soap, ʒj.; water, Oj.; mix and rub together). An efficient enema in obstinate constipation and colic.—*Tinctura Colocynthis*, (Colocynth, ʒj.; star anise, ʒj.; rectified spirit, ʒxiv.; digest for three days and filter). Dose, min. x. to min. xv. in a mixture.—*Decoctum Colocynthis*, (Colocynth, ʒj.; boiling water, ʒvj.; boil for ten minutes, strain, and add sulphuric ether, ʒj.; syrup of orange peel, ʒj.). Both these preparations are diuretic; Dose, fʒss. two or three times daily.

INCOMPATIBLES.—The fixed alkalies; lime water; sulphate of iron; acetates of lead; nitrate of silver; and corrosive sublimate.

CROTONIS TIGLII OLEUM, D. TIGLII OLEUM, L. CROTONIS OLEUM, E. *Croton oil*. *Expressed oil of the seeds of Croton Tiglium*. A native of the continent of India, the Molucca Islands and Ceylon; belonging to the Natural family *Euphorbiaceæ*, and to the Linnæan class and order *Monæcia Monadelphæa*.

BOTANICAL CHARACTERS.—A moderate-sized tree, with a smooth bark; Leaves oblongo-ovate, acuminate, with two flat round glands at the base; Flowers, white, in terminal racemes; Fruit, ovate and triangular, somewhat bigger than a hazel nut, three celled, each cell one seeded.

PHYSICAL PROPERTIES.—Croton seeds (*Grana Tiglii*) are of an irregularly-oval shape, about 6 lines long, $2\frac{1}{2}$ lines thick, and 3 lines broad; they are of a greyish-brown colour, and marked with the ramifications of the raphé; they contain internally a pale yellowish-white albumen, which envelopes the embryo with its large leafy cotyledons. From the kernels, croton oil is obtained by pressure; it is thicker than castor oil, of a pale amber colour, has a feebly sickly odour, and an intensely acrid taste. The kernels yield about half their weight of oil.

CHEMICAL PROPERTIES.—Croton oil consists of a peculiar acid named *Crotonic acid*, dissolved in a bland fixed oil; it is to the acid

that the properties of the oil are due. East Indian croton oil is insoluble in alcohol even with the aid of heat, but is very soluble in sulphuric ether, and in the fixed and volatile oils. According to some recent experiments of Pereira, it would however appear, that croton oil expressed at home from the imported seeds is soluble in an equal volume of alcohol without the aid of heat, forming an uniform transparent mixture which does not separate on standing.

Adulterations.—Castor oil is the only substance employed to adulterate croton oil; it was supposed that it might be readily detected by its solubility in alcohol, the test adopted by the Edinburgh College:—"when agitated with its own volume of pure alcohol and gently heated, croton oil separates on standing, without having undergone any apparent diminution"; but Pereira's experiments above referred to prove that this is a fallacious test, especially as croton oil expressed in England is more active than that imported.

THERAPEUTICAL EFFECTS.—Croton oil is an acrid cathartic, operating speedily, and producing frequent watery evacuations; it does not in general give rise to nausea or griping, and is consequently to be preferred in most cases to other cathartics of equal power. It is used chiefly in obstinate constipation, in comatose affections, and in dropsy. In the various forms of convulsive and neuralgic diseases, it is a most valuable cathartic; given in such affections in small doses, repeated daily for some time, I have in several cases found it a complete specific. Croton oil should not be employed in extreme debility, or where there is any tendency to inflammation in the digestive organs. (See, *Epispastics*.)

DOSE AND MODE OF ADMINISTRATION.—Min. j. or min. ij.—In cases where the patient is unable or unwilling to swallow, it may be dropped on the tongue, or dissolved in ether may be rubbed on the abdomen. If it can be avoided, however, it should never be administered in a fluid form, as it causes a most disagreeable acrid impression in the back of the throat; it may be made into pill with conserve of roses or liquorice powder, or one or two minims may be added to any of the common purgative pill masses, and thus given in divided doses until it operates.—*Sapo Crotonis*, (Croton oil, 2 parts; liquid caustic soda, 1 part). Dose, gr. j. to gr. iij.

ELATERIUM, D. L. E. Elaterium. The feculence of the juice of the fruit (the fresh fruit, L.), of Ecbalium agreste, D.—of Momordica Elaterium, L. E. The Wild or Squirting Cucumber, is a native of Greece, and other parts of the South of Europe, and is cultivated in the British isles; it belongs to the Natural family *Cucurbitaceæ*, and to the Linnæan class and order *Monœcia Monadelphica*.

BOTANICAL CHARACTERS.—An annual, trailing plant, with a thick branching stem about two feet in length; grayish, rugose leaves, and yellow, axillary flowers; Fruit (*Pepo*), is about an inch and a half long, elliptical, green, covered with soft prickles; on quitting the foot-stalk when ripe, it suddenly, in consequence of the elastic structure

of its parietes, discharges with considerable force many brown seeds and a slimy juice through the aperture at its base.

PREPARATION.—The juice of the cut fruit when ripe (not quite ripe, D. E.), is expressed gently through a fine hair-sieve, allowed to rest till it becomes pretty clear, the supernatant liquid rejected, and the feculence dried with a gentle heat; this constitutes *Elaterium*, D. E. *Extractum Elaterii*, L.

PHYSICAL PROPERTIES.—*Elaterium* is in thin, flat or slightly curled, pieces or fragments, light and friable; of a pale, greenish-gray colour, with a very faint odour, but an intensely acrid and bitter taste; the pieces generally bear on the surface an impression of the linen on which they have been dried. An inferior quality, sometimes met with, is of a brownish or dark green colour, very hard, and broken with difficulty.

CHEMICAL PROPERTIES.—According to Hennell's analysis, *elaterium* consists of a crystallized substance (*Elaterin*), green resin, starch, woody fibre, and saline matters. *Elaterin*, the active principle of the drug, may be obtained by exhausting *elaterium* thoroughly with boiling rectified spirit, concentrating this solution, so long as no separation takes place, and then pouring it while hot into a weak boiling solution of potash; on cooling, the *elaterin* crystallizes in minute, colourless, satiny crystals; the quantity obtained varies, in proportion to the quality of the drug employed, from 5 to 26 per cent.

Adulterations.—*Elaterium* is seldom expressly adulterated, but it varies much in strength, owing probably to the different degrees of care bestowed on its preparation; the best test for ascertaining its goodness is the process given above for obtaining its active principle; the quantity of *elaterin* thus procured "should weigh from a seventh to a fourth of the *elaterium*," *Edinburgh Pharmacopœia*.

THERAPEUTICAL EFFECTS.—*Elaterium* is a most powerful drastic cathartic even in minute doses, 1-16th of a grain sometimes producing considerable purging, and 1-4th of a grain, in dropsical cases, generally causing a discharge of several pints of fluid by the bowels; its operation is characterized by nausea, sometimes vomiting, and considerable depression of the circulatory and nervous systems. The chief use of *elaterium* is in passive dropsies, especially ascites and hydrothorax, when it is deemed advisable to attempt the removal of the effused fluid by the bowels. It will also be generally found, that diuresis is more freely established after the operation of *elaterium*. The administration of *elaterium* requires the greatest caution in debilitated habits.

DOSE AND MODE OF ADMINISTRATION.—1-16th to 1-4th of a grain in pill, (it should always be given at first in small doses), in combination with some tonic extract, as of gentian or chamomile.—*Pulvis Elaterii compositus*, (*Elaterium*, gr. iv.; bitartrate of potash, ʒv.; ginger, ʒij.; mix; thirty-six grains contain one grain of *elaterium*). Dose, gr. v. to gr. x.—*Tinctura Elaterii*, (*Elaterium*, gr. viij.; rectified spirit, fʒviij.; dissolve). Dose, fʒss. to fʒij.—*Solutio Elaterinæ*, MORRIES STIRLING. (*Elaterin*, gr. j.; rectified spirit, fʒj.; nitric acid, min. iv.; dissolve). Dose, min. xxx. or min. xl.

In poisoning with elaterium, the same treatment should be followed as in poisoning with gamboge.

EUPHORBIA LATHYRIS.—*Caper-spurge*. An indigenous biennial, belonging to the Natural family *Euphorbiaceæ*, and to the Linnæan class and order *Monœcia Monandria*. It is not officinal in any of the British pharmacopœias, but an oil obtained from the seeds has been introduced into the Paris Codex, as a cheap and efficient substitute for croton oil; it is obtained by simple pressure from the ripe seeds, 44 parts of oil being obtained from 100 parts of the seeds. It is very fluid, of a clear yellow colour, with an acrid taste and a peculiar odour. It is soluble in ether, but insoluble in alcohol.

Calderini, an Italian physician, has used it extensively; he says that its effect is certain and prompt; and that it may be considered as a mild cathartic, not producing either vomiting, colic or tenesmus. It is adapted for all cases in which it is desirable to purge gently but effectually, and with a small dose of medicine. I have tried some experiments with this oil, thinking that it might be an indigenous cathartic of some value, but the results I have arrived at do not corroborate the statements of the French and Italian physicians, which may probably depend on some difference in the oil extracted from the seeds of the plant cultivated in our temperate climate, and that obtained from plants grown in warmer countries. The dose is from min. iv. to min. viij., it may be administered in syrup.

When applied externally, it possesses rubefacient properties similar to those of croton oil.

HELLEBORUS, L. E. *Root of Helleborus niger; Black Hellebore, or Christmas-rose, E. Root of Helleborus officinalis, Oriental or Officinal Hellebore, L.* The black hellebore, the Melampodium of the ancients, a native of the middle and southern parts of Europe, belongs to the Natural family *Ranunculaceæ*, and to the Linnæan class and order *Polyandria Polygynia*.

BOTANICAL CHARACTERS.—Herbaceous; Leaves all radical, pedatisect; Scape leafless, one to two flowered; Flowers large, white.

PREPARATION.—The root should be dug up in February, after the plant is done flowering, and dried quickly.

PHYSICAL PROPERTIES.—As met with in the shops the root consists of two parts, a black root-stock, and numerous undivided fibres or radicals which arise from it; the latter are the active part and should only be used. They are cylindrical, about the thickness of a crow-quill, brownish-black externally, whitish within, brittle; they have a faint unpleasant odour, and a somewhat acrid, bitter taste, but the acidity is much lost by drying.

CHEMICAL PROPERTIES.—Black hellebore root contains a volatile

oil, an acrid volatile acid, and other unimportant substances. Both water and alcohol extract its active properties, which probably depend on the volatile acid.

Adulterations.—Various other roots are substituted for, or intermixed with, black hellebore root on the continent; but in consequence of the limited employment of the drug, the fraud is not practised in this country. The root should be constantly renewed, as it loses its medicinal properties by keeping.

THERAPEUTICAL EFFECTS.—This substance is classed among the vegetable irritant poisons, but in medicinal doses it operates as a drastic cathartic; and although little esteemed in modern practice, it was highly prized by the ancients, as a purgative in cerebral and nervous disorders and in dropsy; it was also said to possess emmenagogue and anthelmintic properties.

DOSE AND MODE OF ADMINISTRATION.—In powder gr. iij. to gr. xij.—*Tinctura Hellebori*, L. (Black hellebore root, bruised, $\text{\text{℥}}\text{v.}$; proof spirit, Oij.; macerate for 14 days and strain). Dose, $\text{f}\text{ʒj.}$ to $\text{f}\text{ʒij.}$

HYDRARGYRUM CUM CRETA, D. L. E.—*Mercury with chalk.*

PREPARATION.—*Dublin.*—“Take of pure mercury, one ounce; prepared chalk, two ounces: rub the mercury and chalk in a porcelain mortar, until the metallic globules cease to be visible, and the mixture acquires a uniform gray colour.” *London. Edinburgh.*—“Triturate together mercury, ʒij. , and prepared chalk, $\text{\text{℥}}\text{v.}$, till the globules disappear.”

PHYSICAL PROPERTIES.—A greyish, heavy, insoluble powder; void of odour, but having an astringent, metallic taste.

CHEMICAL PROPERTIES.—According to the recent investigations of many celebrated chemists, this preparation appears to consist of metallic mercury in a state of minute division, suboxide of mercury, and carbonate of lime combined mechanically; but in what proportion the metal and oxide exist has not been yet ascertained. On the addition of the stronger acids to the powder effervescence takes place; and by exposure to heat the mercury is volatilised.

THERAPEUTICAL EFFECTS.—A gentle cathartic and alterative, peculiarly adapted for infancy and childhood, promoting and improving the secretions of the liver, pancreas, and intestines. In combination with rhubarb, it is employed with much benefit in the diarrhoea of children when the stools are clay-coloured, and when there is acidity of the primæ viæ. Prescribed with dried carbonate of soda, it is our most useful alterative in the cutaneous affections of infancy and childhood. (See, *Special Stimulants*).

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. ij. to gr. v., for children; it is seldom prescribed for adults, the dose would be from gr. x. to ʒss.

INCOMPATIBLES.—The mineral acids; acetic acid; alum; and all sulphates.

HYDRARGYRUM CUM MAGNESIA. D.—*Mercury with Magnesia.*

Prepared in a similar manner to the last, carbonate of magnesia being employed instead of prepared chalk. Its properties would appear to be nearly similar, but it acts with greater certainty as a cathartic, and is consequently to be preferred in many cases. (See, *Special Stimulants*.)

HYDRARGYRI PILULÆ, D. L. E.—*Pills of Mercury. Blue pill.*

PREPARATION.—By triturating in a mortar, until the globules disappear, two parts of purified mercury, and three parts of confection of red roses, and then adding one part of liquorice root, in fine powder, and beating together until they are all incorporated.

PHYSICAL PROPERTIES.—A soft pill mass, of a dark blue colour.

CHEMICAL PROPERTIES.—This preparation, like the two last, probably consists of metallic mercury in a state of minute division combined with the suboxide of mercury. Three grains of the pill contain one grain of mercury.

Adulterations.—If the pill mass be prepared with conserve of roses to which sulphuric acid had been added, as is sometimes done to brighten its colour, it will contain subsulphate of mercury which possesses very irritating properties. It may be detected by triturating the mass with boiling water, and adding to the filtered liquor solution of nitrate of baryta; if any sulphate be present, a white precipitate insoluble in nitric acid will be produced.

THERAPEUTICAL EFFECTS.—Although blue pill is most generally employed to produce the specific effect of the mercurial preparations, in full doses it operates as a cathartic. In consequence of its general alterative powers, and the peculiar property it possesses of improving and stimulating the biliary secretions, it is commonly prescribed in combination with the different cathartic pill masses, particularly the compound colocynth pill. Thus combined, taken at night, and followed by an active purgative draught in the morning, it is found especially useful in the milder forms of derangement of the biliary organs. (See, *Special Stimulants*).

DOSE AND MODE OF ADMINISTRATION.—Given alone as a cathartic, gr. xij. to gr. xx.; combined with other purgatives, gr. v. to gr. viij.

JALAPA, D. L. E. *Root of Exogonium purga (Bentham), D.,—of Ipomœa jalapa (Don, L.),—of Ipomœa purga (Nees Von Esenbeck), E. Jalap.* The officinal jalap root is now well known to be obtained from the plant indicated above by the nomenclature of different botanists. It is a native of Mexico and Vera-Cruz; and belongs to the Natural family *Convolvulaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Roots tuberous, incrassated; Stems, herbaceous, smooth, climbing; Leaves, greenish, alternate, petioled, cordiform; Flowers, large, one to three, on axillary peduncles; corolla, large, campanulate, white with a reddish-purple centre.

PREPARATION.—The root is dug up, at the time the young shoots begin to appear, and dried by exposure to the air, or suspended in net bags over a fire.

PHYSICAL PROPERTIES.—Jalap root is met with in commerce in pieces varying much both in size and form. The entire tubers are ovoid, from the size of a nut to that of an orange, generally incised more or less deeply and in different directions; externally rugose, compact, dark brown; whitish or yellowish within, marked with concentric zones. The flat pieces are merely transverse slices of the entire tubers. The fracture of jalap root is marbled and compact, presenting many brilliant points, (resin); the odour is faint but very nauseating; the taste, nauseous and acrid. It is pulverised with difficulty.

CHEMICAL PROPERTIES.—Jalap is composed of hard and soft resin, bitter extractive, gummy extractive, albumen, uncrystallizable sugar, gum, mucilage, starch, and colouring matter. The resin, its active principle, exists in the proportion of from ten to fourteen per cent.; it is soluble in alcohol, while water dissolves only the non-cathartic components of the root. The starch is often eaten by insects, such pieces are said to be worm-eaten, they are the most active as they contain in proportion to their weight more resin. Jalap resin is of a slightly yellow colour, odourless and tasteless when pure; insoluble in water or ether, but readily soluble in alcohol. It assumes a beautiful crimson colour when moistened with strong sulphuric acid, and allowed to stand for a quarter of an hour, which colour disappears on the addition of water.

Adulterations.—Jalap root, as met with in English commerce, can scarcely be said to be adulterated; at one time slices of white Bryony root were mixed with it, but the white colour and intense bitterness of the spurious root rendered the fraud easy of detection. On the Continent many forms of spurious or counterfeit jalaps are met with mixed with the true root; they may, for the most part, be distinguished by being very rugose, of a reddish or rose colour internally, not compact, with a faint odour, and almost insipid. The purity of jalap resin may be readily ascertained by its action with sulphuric acid, as the beautiful crimson colour above described is not manifested if any other resin be present: the most ordinary adulteration is with resin of guaiacum. This admixture gives a red colour with sulphuric acid, which becomes greenish on the addition of water if even the sixtieth part of guaiacum resin be contained in it.

THERAPEUTICAL EFFECTS.—Jalap is a powerful cathartic, operating principally upon the small intestines; administered in too large a dose, it causes violent hypercatharsis and inflammation. In medicinal doses it is certain in its operation, increasing the peristaltic action and promoting the secretions and exhalations of the alimen-

tary canal without causing any irritation; consequently it is frequently and beneficially prescribed for children. Its chief use as a cathartic, is in simple constipation without inflammation, in ascites, in scrofulous affections, and in verminous diseases: in the two latter, it is beneficially combined with calomel; in dropsy, with cream of tartar. It sometimes produces salivation, if its use be long persisted in. Jalap produces purging if applied to a wound or to the surface of the body, the cuticle having been previously removed by means of a blister.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to gr. xxx., for an adult; gr. ij. to gr. viij., for children; it may be given made into a bolus, or suspended in water or any simple decoction.—*Pulvis Jalapæ compositus*, D. L. E. (“Take of Jalap, in fine powder, two ounces; bitartrate of potash, three ounces and a half; ginger in fine powder, half an ounce: mix thoroughly by trituration, and pass the powder through a fine sieve,” D.—“Jalap powder, ʒij. (ʒj. E.); bitartrate of potash, ʒvj. (ʒij., E.); (ginger, ʒij. L.); rub to very fine powder, and mix,” L. E.). Hydragogue cathartic; Dose, ʒss., to ʒiss.—*Extractum Jalapæ*, L. (Jalap root, powdered, lbiss.; rectified spirit, cong. j.; distilled water, cong. ij.; macerate in the spirit for four days, and pour off the tincture; boil down the residue in the water to cong. ss.; then strain the tincture and the decoction separately, evaporate the latter, and distil the former until each thickens; lastly, mix the extract with the resin, and evaporate to a proper consistence; this extract should be kept *soft* to form pills, and *hard* for powdering). Dose, gr. x. to ʒj.—*Extractum sive Resina Jalapæ*, E. (Take any convenient quantity of jalap in moderately fine powder; mix it thoroughly with enough of rectified spirit to moisten it well; put it in 12 hours into a percolator and exhaust the powder with rectified spirit; distil off the greater part of the spirit and concentrate the residuum over the vapour bath to a due consistence). This is the impure resin; the dose is from gr. iij. to gr. x.; it should be given in a state of minute division, for which purpose it may be rubbed with sugar or some mild powder, or made into an emulsion with milk, sugar, and almonds.—*Sapo Jalapinus*, (Castile soap; and jalap resin, equal parts; rectified spirit, q. s.; dissolve and evaporate with a gentle heat to the consistence of a conserve). Dose, gr. xij. to ʒj., for adults; gr. iij. to gr. vj., for children.—*Tinctura Jalapæ*, D. L. E. (Jalap, in coarse powder (bruised, L.), ʒv. (ʒx., L. ʒviij., E.); proof spirit, Oiss. (Oij., L. E.); macerate for 7 (14, D. L.) days, strain, express and filter (strain, L. E.); “or may be prepared by percolation,” E.). Dose, fʒj. to fʒiv.

LINUM CATHARTICUM, E.—*Purging-flax*. A slender indigenous annual, from two to six inches high, with small white flowers drooping before expansion. It belongs to the Natural family *Linaceæ*, and

to the Linnæan class and order *Pentandria Monogynia*. The whole herb is officinal, it is void of odour, but has an intensely bitter taste. It was formerly held in high esteem as a cathartic and diuretic; at present it is never used in regular practice, and has been only retained in the Edinburgh Pharmacopœia on the authority of Dr. Christison, as a useful indigenous cathartic in doses of a drachm of the powder, or an infusion of two or three drachms of the herb.

MAGNESIA. *Magnesia* (described in the division *Antacids*), given in full doses operates as a gentle cathartic; its effect, however, being by no means uniform or certain, depending probably on the quantity of free acid in the stomach, by union with which it forms soluble magnesian salts. It does not increase the secretions of the intestines, but by stimulating their muscular fibres, causes the evacuation of their contents. Magnesia is very generally employed as a purgative in infantile diseases, and by females and persons of a delicate habit of body; it is most usually combined with rhubarb, a combination frequently employed and with much benefit in the early stages of diarrhœa, particularly when dependant on irritation or acidity of the primæ viæ. Magnesia when taken for a long period has in some instances accumulated to a *great extent*, and even formed concretions in the bowels. When therefore, it is thought advisable to continue its use for any time, it will be necessary to administer an active cathartic occasionally. Dose, ʒj. to ʒij. for adults; gr. ij. to gr. x. for children.

MAGNESIÆ CARBONAS. *Carbonate of Magnesia* (described in the division *Antacids*), is a still milder cathartic, it is employed in the same cases, but is used less frequently than magnesia, in consequence of its producing flatulence from the disengagement of carbonic acid in the stomach. Dose, ʒj. to ʒij. for adults; gr. x. to ʒj. for children. A mildly laxative effervescing draught may be prepared with a drachm of carbonate of magnesia, the juice of one lemon, and a wine glassful of water. The solution of the bicarbonate of magnesia acts as a gentle laxative in doses of from fʒij. to fʒiv.; its activity may be increased and an agreeable effervescing draught of citrate of magnesia formed by the addition of lemon-juice or citric acid. The latter in the proportion of ʒss. of the crystals dissolved in water for each ounce of the fluid magnesia.

MAGNESIÆ SULPHAS, D. L. E. *Sulphate of Magnesia. Epsom Salts.*

PREPARATION.—An article of the *Materia Medica*; it was formerly prepared by

evaporating the waters of the Epsom springs; at present a variety of processes are followed by different manufacturers, which it would be out of place to enter into any account of here.

PHYSICAL PROPERTIES.—Usually met with in small acicular crystals, transparent and colourless; inodorous; with an extremely bitter, disagreeable taste. By slow crystallization tolerably large crystals are readily obtained, their form is, the four-sided rhombic prism with reversed dihedral summits, or four-sided pyramids. Specific gravity 1.66.

CHEMICAL PROPERTIES.—It is composed of one equivalent of magnesia, 1 of acid, and 7 of water, ($\text{MgO}, \text{SO}^3, \text{HO} + 6\text{HO}$). It is permanent in the air, but in a slightly increased temperature effloresces, losing 6 equivalents of water at a temperature considerably under 300° , first fusing in its water of crystallization; if the temperature be raised still higher it becomes anhydrous, and undergoes the igneous fusion, but is not decomposed. It dissolves in its own weight of water at 60° , and in three-fourths of its weight of boiling water. It is insoluble in alcohol.

Adulterations.—At present this salt is met with in a state of great purity; sometimes, however, when prepared from bittern it contains chloride of magnesium, which being very deliquescent, is readily recognised. On the continent in the present day, and formerly also in this country, crystals of sulphate of soda, which is a much cheaper salt, are fraudulently mixed with those of sulphate of magnesia; the sophistication is best detected by the test of the Edinburgh Pharmacopœia, which is intended to show, that the full proportion of magnesia is present:—"ten grs. dissolved in f3j. of water, and treated with solution of carbonate of ammonia, are not entirely precipitated by 280 minims of solution of phosphate of soda, (1 of salt, to 20 water)."

THERAPEUTICAL EFFECTS.—Sulphate of magnesia is a refrigerant cathartic, operating mildly but effectually, augmenting the secretions and promoting the peristaltic action of the intestinal canal; the evacuations are watery, and are not accompanied by either nausea or griping. It is consequently more generally employed at present than perhaps any other medicine of this class; it has also the advantage of great cheapness. This salt is peculiarly adapted for all forms of febrile and inflammatory affections, especially when accompanied by constipation. In short, there are but few diseases in which cathartics are indicated, that it may not be employed in with benefit. Sulphate of magnesia forms the active ingredient in many mineral waters.

DOSE AND MODE OF ADMINISTRATION.—3ij. to 3j. dissolved in seven or eight times its weight of water. Its cathartic properties are promoted by dilution, therefore a smaller dose than usual will suffice, if dissolved in a large quantity of water; tincture of some aromatic bitter, as of cascarilla, calumba, orange peel, &c. is added with advantage to the solution to conceal its nauseous taste; this is best done, however, by the addition of ten or twelve minims of dilute

sulphuric acid, or by administering the salt in the acid infusion of roses, an elegant and beneficial form in febrile diseases.—*Pulvis Salinus compositus*, E. (Pure muriate of soda; and sulphate of magnesia, of each, ℥iv.; sulphate of potash, ℥iij.; dry the salts with a gentle heat, and pulverise them separately; then triturate them well together, and keep in a well-closed vessel). Dose, ℥ij. to ʒss. dissolved in Oss. of water. In the preparation of this powder, instead of the sulphate of potash, I have employed ℥iv. of sulphate of soda, and found the resulting compound a more effectual cathartic in smaller doses; ʒj. dissolved in half a pint of water, and taken in the morning before breakfast, operating freely, and with perfect safety.—*Enema Catharticum*, D. E. (“Take of sulphate of magnesia, one ounce; olive oil, one fluid ounce; mucilage of barley, sixteen fluid ounces. Dissolve the sulphate of magnesia in the mucilage, add the oil, and mix,” D.—“Olive oil, ʒj.; sulphate of magnesia, ʒss.; sugar, ʒj.; senna, ʒss.; boiling water, fʒxvj.; infuse the senna in the water for an hour; then dissolve the salt and the sugar, and add the oil,” E.). A useful cathartic enema for general purposes.

INCOMPATIBLES.—The alkalies, and their carbonates; lime water; muriate of ammonia; chloride of calcium; muriate of baryta; the acetates of lead; and nitrate of silver. The bicarbonates of the alkalies are not incompatible with sulphate of magnesia, unless at the temperature of boiling water.

MANGANESÆ SULPHAS. *Sulphate of Manganese*. This salt, which is left as the residue in the preparation of oxygen gas by heating together black oxide of manganese and sulphuric acid, acts as a cathartic when administered in doses of from one to six drachms dissolved in a large quantity of water. It seems to stimulate the parenchymatous viscera of the abdomen, particularly the liver, to increased secretion, as the evacuations caused by it contain a large quantity of bile. It is rarely used at present, but has been recently brought under the notice of the profession by Dr. Ure of London, as likely to prove a useful purgative in gouty affections. In several cases in which I tried it I found its action very uncertain, and its disagreeable styptic taste a great objection to its use. It should be always combined with some other cathartic, as with senna, for if given alone it is apt to produce vomiting.

MANNA, D. L. E. *An exudation from Fraxinus Ornus and other species, constitutes the Manna of commerce*, D.—*Concrete juice of Ornus Europæa*, L.—*Sweet concrete exudation, probably from several species of Fraxinus, and Ornus*, E. Nearly all the species of the genera *Fraxinus* and *Ornus* yield manna, but the greater portion of what occurs in commerce is obtained from the *Fraxinus rotundifolia*;

a native of the south of Europe, chiefly of Sicily and the South of Italy. It belongs to the Natural family *Oleaceæ*, and to the Linnean class and order *Dyandria Monogynia*.

BOTANICAL CHARACTERS.—*Fraxinus ornus* is a small tree; Leaves opposite, pinnate; Panicles, large, many flowered; Flowers, small, polygamous, white; the whole tree resembles much in appearance the common ash of our climate.

PREPARATION.—The juice of the stem exudes spontaneously either from fissures in the bark, through punctures made by insects, or more usually from incisions made expressly with a hooked knife. It concretes rapidly on the tree, and is then removed by the hand.

PHYSICAL PROPERTIES.—Two sorts are commonly met with in the shops. 1st.—Flake manna, *Manna cannellata*; it occurs in stalactiform pieces, from one to six inches in length, and one or two inches in width, uneven, rugged, porous and friable; of a dull yellowish white colour; presenting a furrow on the surface by which they adhered to the tree, on which side they are usually somewhat soiled; it has a faint, somewhat nauseous odour, and a sweetish insipid taste. 2nd.—Fatty manna, *Manna pinguis*; it is in soft, viscid, fragments of a brownish-yellow colour, much soiled and mixed with impurities; its odour is very nauseous, and its taste viscid and disagreeable.

CHEMICAL PROPERTIES.—Manna consists of a peculiar saccharine principle named *Mannite*, uncrystallizable sugar, gummy matter, nitrogenous matter and moisture; it contains about 40 per cent. of mannite and about 10 per cent. of sugar. It softens with the heat of the hand, and melts at a temperature a little higher; it is soluble in three parts of water at 60°, and in eight parts of rectified spirit. Mannite, its active principle, may be obtained by boiling manna in alcohol, and pouring off the spirit, from which as it cools the mannite is deposited in crystals.

Flake manna, which is alone employed in medicine, is not liable to adulteration.

THERAPEUTICAL EFFECTS.—Manna is a very mild laxative, employed only in the diseases of children and delicate females; in the present day it is seldom administered alone, being generally used for sweetening cathartic mixtures. When first gathered, manna does not possess any laxative properties, and is employed as a nutritive article of diet in the countries where it is produced. Manna, when it has become hard from keeping, is an excellent basis for forming the more active medicines into pills.

DOSE AND MODE OF ADMINISTRATION.—For children, ʒj. to ʒss., for adults, ʒj. to ʒij.—*Mannite*, for children, ʒss. to ʒij., for adults, ʒss. to ʒj.

MEL, D. L. E. *Saccharine secretion of Apis mellifica*, D. E.—*Juice extracted from flowers, and prepared by the Bee*, L. *Honey*. Honey is secreted by the nectaries of most flowers, from whence it is col-

lected by the Bee, an insect belonging to the order *Hymenoptera*; in the honey-bag of the insect, which is a dilatation of the œsophagus, it probably undergoes some alteration previously to its deposition in the cells of the honey-comb. Honey is too well known to require any description; it is composed of grape-sugar, cane-sugar, mannite, acetic acid, aromatic principle, wax, &c. It is sometimes adulterated with sand, with starch, or with wheaten or pea flour; the first adulteration may be detected by dissolving in water; the others by the action of tincture of iodine on the cooled decoction, which is rendered blue if any fecula be present. Dissolved in a large quantity of water, honey possesses demulcent and cooling properties; in a small portion of water it operates as a mild laxative. It is now but little used in medicine; nevertheless, eaten at breakfast it is found very beneficial by persons liable to habitual constipation. Honey has in some instances proved poisonous, in consequence of having been collected by the bees from poisonous flowers. By melting honey in a water bath and straining while hot through flannel, Clarified honey, *Mel Depuratum*, D., is prepared. Both the flavour and odour of honey are injured by this process.

OLIVÆ OLEUM, D. L. E. *Oil obtained from the pericarp (expressed from the fruit, L.) of Olea Europæa.* This tree, originally a native of Asia Minor, now grows freely on the borders of the Mediterranean, and is cultivated all over the south of Europe, especially in Provence. It belongs to the Natural family *Oleaceæ*, and to the Linnæan class and order *Diandria Monogynia*.

BOTANICAL CHARACTERS.—A moderately sized tree with hard, veined wood; Leaves, in pairs, acute, hoary beneath, giving a whitish character to the foliage; Flowers, small, white; Drupe, elliptical, dark-bluish-green, with a hard nut generally one seeded.

PREPARATION.—The finer sorts of the oil are obtained by simply pressing the fresh, ripe, fruit in a mill; a second sort, by moistening the marc, left after the first expression, with boiling water, and repressing it; and a third, and very inferior sort, by boiling this cake in water, and submitting it to very strong pressure.

PHYSICAL PROPERTIES.—Olive oil is a transparent, unctuous fluid, of a yellow colour, pale or greenish according to quality, (the finer sorts being of a lighter shade); when good, odourless, with a bland, oily, taste; by keeping it acquires both a rancid odour and taste, more slowly, however, than the other fixed oils. Specific gravity, .911 at 77° F.

CHEMICAL PROPERTIES.—It is composed of 72 parts of *elaine*, and 28 of *margarin*. Olive oil readily saponifies; exposed to the air, even in thin layers, it thickens but does not dry. It congeals at 36° F.; is insoluble in water or in alcohol, but at 59° it dissolves in once and a half its weight of ether.

Adulterations.—Cheaper vegetable oils, as poppy-oil and rape-seed oil, are commonly employed to adulterate olive oil. The best

test for ascertaining its purity is that of Poutet, adopted in the last edition of the Edinburgh Pharmacopœia:—"mix with a twelfth of its volume of solution of nitrate of mercury, prepared by dissolving with a gentle heat ℥iv. of mercury in ℥iixss. of nitric acid (density, 1380 to 1390); if pure it becomes in three or four hours like a firm fat, without any separation of liquid oil." For ordinary purposes the presence of other fixed oils may be more readily ascertained, by shaking the oil in a bottle half filled, when, if it be pure, the surface of the oil soon becomes smooth by repose, but if it be adulterated, a number of air bubbles, *beads*, remain.

THERAPEUTICAL EFFECTS.—It is seldom given by the mouth as a cathartic, but forms an admirable addition to *laxative enemata*, in inflammation or spasms of the intestines, in dysentery, or in irritation of the urino-genital organs. (See, *Emollients*).

DOSE AND MODE OF ADMINISTRATION.— ℥ij. to ℥ij. by the mouth; ℥ij. to ℥iv. in an enema with decoction of barley.

POTASSÆ ACETAS, D. L. E. *Acetate of Potash.*

PREPARATION.—*Dublin.*—"Take of pure carbonate of potash, one pound; acetic acid of commerce (specific gravity 1044), two pints. To the acid, placed in a porcelain capsule, gradually add the carbonate of potash, and, when effervescence has ceased, boil for a couple of minutes. Add now, if necessary, a few drops of the same acetic acid, so that the solution may have a slightly acid reaction, and having evaporated to dryness, melt the residue, by the cautious application of heat, in a clean pot of cast iron. The liquefied salt is now to be removed from the fire, and when, upon cooling, it has solidified, it should be quickly broken into fragments of a suitable size, and enclosed in a bottle furnished with an air-tight stopper." The London and Edinburgh colleges direct it to be prepared by dissolving; the former, ℔j. of carbonate of potash in, acetic acid, ℥xxxvj. , and distilled water, ℥xij. ; the latter, ℥vij. or a sufficiency of dry carbonate of potash, in Oiss. of pyroligneous acid, to neutralize it, straining and evaporating with a cautious heat the liquor, so as to obtain on cooling a crystalline mass.

PHYSICAL PROPERTIES.—Masses of white, needle-shaped, satiny crystals, odourless when dry, but emitting a faint acetous odour when moistened; they have a pungent, somewhat acrid but cooling taste; and are soapy to the touch. Specific gravity, 2.10.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of potassa, and 1 of anhydrous acetic acid, ($\text{KO, C}^4\text{H}^3\text{O}^3$); it deliquesces on exposure to the air, and is very soluble both in water, and in alcohol; by heat it is fused, and if the heat be increased is decomposed, *pyro-acetic spirit* being driven off and *carbonate of potash* left.

This salt is not liable to adulteration; it should be snow-white, and perfectly neutral.

THERAPEUTICAL EFFECTS.—Scarcely ever used as a cathartic, nevertheless in sufficient doses it operates effectually, producing watery evacuations, and is therefore, independently of its diuretic properties, well adapted for dropsical diseases. (See, *Diuretics*.)

DOSE AND MODE OF ADMINISTRATION.—As a cathartic, ℥ij. to ℥ij. dissolved in a large quantity of water.

INCOMPATIBLES.—The mineral acids, and their soluble salts; and tartaric acid.

POTASSÆ BISULPHAS, D. L. E. *Bisulphate of Potash.*

PREPARATION.—*Dublin.*—"Take of sulphate of potash, in powder, three ounces; pure sulphuric acid, one fluid ounce: Place the acid and salt in a small porcelain capsule, and to this apply a heat capable of liquefying its contents, and which should be continued until acid vapours cease to be given off. The bisulphate, which concretes as it cools, should be reduced to a fine powder, and preserved in a well-stopped bottle."
London. Edinburgh.—"Take of the salt which remains after the distillation of nitric acid, lbij.; sulphuric acid (of commerce, E.), lbj. (f3vj. f3j., E.); boiling water, Ovj.; dissolve the salt in the water, add the acid, and mix. Then concentrate the solution, and set it aside, that crystals may be formed."

PHYSICAL PROPERTIES.—In minute, transparent crystals which belong to the right prismatic system; odourless, with a very acid and bitter taste. Specific gravity, 2.163.

CHEMICAL PROPERTIES.—It is composed of 2 equivalents of sulphuric acid, 1 of potassa, and 1 of water, ($\text{HO}, \text{SO}^3 + \text{KO}, \text{SO}^3$); the excess of acid acting upon metals and alkaline bases very much as if it were free. The crystals are permanent in the air, and are soluble in about twice their weight of water at 60° ; the solution has a strongly acid reaction. By a red heat, the water of crystallization and half the acid are expelled, and sulphate of potash remains.

THERAPEUTICAL EFFECTS.—Rarely employed in medicine; it operates as a mild cathartic, and as its after effects are tonic, it may be used with advantage in debilitated habits; combined with rhubarb it conceals much of its nauseous taste, and promotes its cathartic properties. Dr. Barker proposed a solution of 73 grs. of this salt, mixed with a solution of 72 grs. of carbonate of soda as a cheap effervescing purgative draught, but it forms an extremely nauseous compound.

DOSE AND MODE OF ADMINISTRATION.—3ss. to 3iss. dissolved in from f3ijj. to f3vj. of water.

INCOMPATIBLES.—Alkalies; earths, and their carbonates; metallic salts; and tartaric acid.

POTASSÆ BITARTRAS, D. L. E. TARTARI CRYSTALLI, D. *Bitartrate of Potash; Acid Tartrate of Potash; Crystals of Tartar; Crude Tartar; Cream of Tartar.*

PREPARATION.—Bitartrate of potash is an article of the *Materia Medica*; it is obtained by dissolving and recrystallizing *argol*, an obscurely crystalline substance, which concretes on the inside of casks in which new wine has been kept; this constitutes the *crystalli tartari* of the *Dublin Pharmacopœia*. A purer salt is procured by redissolving these crystals, evaporating the solution slowly, and removing the crust as it forms on the surface, whence the name *cream of tartar*.

PHYSICAL PROPERTIES.—This salt is met with in the form either

of a fine white powder, or a semi-transparent crystalline mass, the crystals being oblique rhombic prisms; it is without odour, but has an agreeable acid taste. Specific gravity, 1.953.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of potassa, and 1 of tartaric acid, combined in the crystalline state with 1 of water, ($\text{HO}, \text{KO}, \text{H}^4\text{C}^8\text{O}^{10}$) it is therefore correctly speaking a monobasic tartrate; it is unalterable in the air, is soluble in 184 parts of water at 68° , and in 18 parts of boiling water, the solution having a strongly acid reaction. By heat the salt is decomposed, and converted into a compound of charcoal and carbonate of potash, (*Black Flux*).

Adulterations.—This salt in the state of powder is very much adulterated; the substances commonly employed for this purpose are, finely powdered marble, alum, bisulphate of potash, and wheaten flour or starch. The tests of the Edinburgh Pharmacopœia will detect any of these impurities; “Entirely soluble in 40 parts of boiling water. Grs. xl. in solution are neutralized with gr. xxx. of crystallized carbonate of soda; and when then precipitated with gr. lxx. of nitrate of lead, the liquid remains precipitable by more of the test.”

THERAPEUTICAL EFFECTS.—In full doses cream of tartar operates as an active cathartic, producing many watery evacuations without much irritation. It is seldom prescribed singly, but, in general, with some of the milder vegetable cathartics. Thus, combined with sulphur in the form of electuary, it is an exceedingly useful purgative in hemorrhoidal affections and in skin diseases; and with jalap, it forms an excellent cathartic in dropsies.

DOSE AND MODE OF ADMINISTRATION.— 3iij. to 3vj. made into an electuary with honey or treacle. Its solubility in water may be much increased, without impairing its medicinal activity, by adding to it a fourth of its weight of boracic acid or borax.—*Effervescing aperient with cream of tartar*, (Cream of tartar, 3iij. ; carbonate of soda, in crystals, 3iiss. ; water, f3viiij.). For one dose.

INCOMPATIBLES.—The mineral acids; the alkalies; lime water; the carbonates of potash and of soda; acetate of lead; and magnesia, and its sulphate.

POTASSÆ SULPHAS, D. L. E. *Sulphate of Potash.*

PREPARATION.—*Dublin.*—“Take of the residuum of the process for *Acidum Nitricum Purum*, one pound; fresh burned lime, six ounces; water, two quarts; carbonate of potash, from pearl-ash, one drachm; dilute sulphuric acid, six fluid drachms, or as much as is sufficient: Slake the lime in four ounces of the water, and having dissolved the residuum of the nitric acid process in the remainder of the water, and raised the solution to the temperature of ebullition, gradually add to it the slaked lime, until reddened litmus paper immersed in it is restored to a blue colour. Filter the solution through calico, and to it, raised to the boiling point, add the carbonate of potash, as long as there is any precipitate. Filter again, add the dilute sulphuric acid, so as to produce a neutral or very slightly acid solution, and, having evaporated this till a film

forms on its surface, set it by for twenty-four hours. The crystals which will then have formed should be dried on blotting paper, and preserved for use." *London*.—"Take of the salt which remains after the distillation of nitric acid, lbij. ; boiling water, cong. ij. ; ignite the salt in a crucible until the excess of sulphuric acid is entirely expelled, then boil it in the water until a pellicle floats, and the liquor being strained, set it aside that crystals may be formed. The liquor being poured off, dry them." *Edinburgh*.—"Take of the residuum of the preparation of pure nitric acid, lbij. ; boiling water, cong. ij. ; white marble in powder, a sufficiency. Dissolve the salt in the water ; add the marble gradually till effervescence ceases, and the solution is completely neutralized ; filter the liquid, and evaporate it till a pellicle forms on its surface ; then set it aside to cool and form crystals."

PHYSICAL PROPERTIES.—A solid white salt, crystallizing usually in single or double six-sided prisms, terminated by six-sided pyramids ; inodorous, with a slightly bitter saline taste. The crystals are very hard, and are therefore employed in pharmacy for triturating and dividing vegetable powders. Specific gravity, 2.4.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent, of potassa, and 1 of sulphuric acid, (KO, SO^3) ; is unalterable in the air ; heated it decrepitates, and at a strong red heat fuses, but is not decomposed ; it requires 9 parts of water at 60° , and 5 of boiling water for its solution, but is insoluble in alcohol.

Adulterations.—Sulphate of potash is seldom adulterated in this country ; on the continent, however, it has often been found to contain sulphates of copper, of zinc, or of iron, and in some instances corrosive sublimate. The best tests of its purity are, the neutrality of the solution and its not precipitating with gallic acid, with ammonia, with hydro-sulphate of ammonia, or with sulphate of silver.

THERAPEUTICAL EFFECTS.—In doses of from two to four drachms, this salt has occasionally produced symptoms of irritant poisoning ; it is nevertheless a mild cathartic generally operating effectually, and with scarcely any disturbance of the system, but on account of its little solubility it is not much employed alone. It is not adapted for children, as it is apt to produce vomiting if given to them in even a moderate dose. Sulphate of potash is an excellent purgative for females after delivery, when it is wished to diminish the secretion of milk.

DOSE AND MODE OF ADMINISTRATION.— 3j. to 3iv. dissolved in warm water, or in powder combined with rhubarb.—*Potassæ sulphas cum sulphure*, E. (Nitrate of potash ; and sulphur, equal parts ; mix thoroughly, and project in small successive portions into a red-hot crucible ; when the deflagration is over and the salt has cooled, reduce it to powder, and preserve in well-closed bottles). A mild cathartic, much more soluble than the plain sulphate. Dose 3ss. to 3j.

INCOMPATIBLES.—Nitric, and muriatic acids ; tartaric acid ; chloride of calcium ; chloride of barium ; the acetate, and diacetate of lead ; nitrate of silver ; corrosive sublimate ; and sulphate of magnesia.

POTASSÆ TARTRAS, D. L. E. *Tartrate of Potash ; Neutral Tartrate of Potash.*

PREPARATION.—*Dublin.*—"Take of carbonate of potash from pearl-ash, eight ounces ; white bitartrate of potash, in fine powder, one pound, or a sufficient quantity ; distilled water, half a gallon : Dissolve the carbonate of potash in the water, and to the solution, while boiling hot, gradually add the bitartrate, until the liquid, after the ebullition has been continued for a couple of minutes, ceases to change the colour of blue or reddened litmus. Filter through calico, and having evaporated the clear liquor until a pellicle forms on its surface, set it by to crystallize. After twelve hours pour off the liquid, and, having dried the crystals on bibulous paper, preserve them in a well-stopped bottle." *London. Edinburgh.*—"Bitartrate of potash, in powder, ℥iij. ; carbonate of potash, ℥xvj. (or a sufficiency, L.) ; boiling water, Ovj. ; dissolve the carbonate in the boiling water, then add the bitartrate (till the liquor is neutralized, E.), and boil. Filter the liquor, and concentrate by boiling till a pellicle floats on the surface, and set it aside that crystals may be formed. The liquor being poured off, dry these, and again evaporate the liquor, that crystals may be produced."

PHYSICAL PROPERTIES.—A solid, white salt, crystalline, but generally met with in the form of a granular powder ; the crystals are small right rhombic prisms. It is inodorous, and has a cooling saline taste. Specific gravity, 1.556.

CHEMICAL PROPERTIES.—It is composed of 2 equivalents of potassa, and 1 of tartaric acid (${}^2\text{KO}$, $\text{C}^8\text{H}^4\text{O}^{10}$) and is therefore a bibasic-tartrate of potash ; it attracts moisture in a damp atmosphere, but does not deliquesce ; exposed to heat it is decomposed, and converted into a compound of carbonate of potash and charcoal. It is soluble in an equal weight of cold water, whence the name *soluble tartar* is applied to it ; it is likewise soluble in alcohol.

Adulterations.—This salt is not unfrequently adulterated with the bitartrate, which may be known by its not being soluble in its own weight of water at 50° . It also sometimes contains carbonate or sulphate of potash or chloride of potassium ; any of which may be detected "by the precipitates occasioned in it by chloride of barium or acetate of lead not being soluble in dilute nitric acid ;" *London Pharmacopœia.*

THERAPEUTICAL EFFECTS.—A mild but efficient purgative, not much employed in the present day. By accelerating the operation of the resinous purgatives, it corrects their griping properties.

DOSE AND MODE OF ADMINISTRATION.—℥ij. to 3x. in solution.

INCOMPATIBLES.—All acids, and most acidulous salts ; lime water ; chloride of calcium ; nitrate of silver ; and acetate of lead.

PRUNA, D. L. E. *Prunes.* *The dried fruit of Prunus domestica.* The plum tree, originally a native of Syria, is now cultivated extensively in the temperate regions of Europe, and in the British Isles ; it belongs to the Natural family *Rosaceæ* (*Drupaceæ*, Lindley), and to the Linnæan class and order *Icosandria Monogynia*. The fruit dried in the sun constitutes *prunes* ; they are imported principally from Bourdeaux. Prunes are mildly laxative, and are sometimes

added to infusion of senna to conceal its nauseous taste. They enter into the composition of the electuary of senna of the pharmacopœias.

RHAMNI BACCÆ, E. RHAMNUS, L. *Buckthorn berries.* *Fruit of Rhamnus catharticus.* An indigenous shrub belonging to the Natural family *Rhamnaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Stems about ten feet high, branching, spiny; Leaves ovate, sharply serrated; Flowers small, yellowish-green, diœcious; Fruit, a berry.

PHYSICAL PROPERTIES.—The berries are about the size of peas, black, shining, four-seeded, with a green juicy parenchyma; they have an acrid, nauseous taste, and when bruised, emit a faint unpleasant odour. The juice is preserved in the form of syrup.

CHEMICAL PROPERTIES.—The juice consists of a peculiar colouring matter, acetic acid, mucilage, sugar, and nitrogenous matter. The nature of its purgative principle is unknown. By evaporating to dryness the juice mixed with lime or with alum, the pigment, *sapgreen*, is obtained.

Adulterations.—The berries of the *Rhamnus frangula* are often substituted for, or mixed with buckthorn berries; they may be detected by having only *two* seeds.

THERAPEUTICAL EFFECTS—The fresh berries or their expressed juice operate as powerful cathartics, producing many watery evacuations; but in consequence of the severity of their operation frequently accompanied by severe tormina, thirst, and distressing nausea, although in former days much vaunted in the treatment of dropsy, they are at present scarcely ever used.

DOSE AND MODE OF ADMINISTRATION.—Of the fresh berries, 10 to 20.—*Syrupus Rhamni*, L. E. (Fresh juice of the berries, Oiv.; ginger, sliced; and pimento, bruised (powdered, L.), of each, ʒvj.; let the juice rest for 3 days that the dregs may subside, and strain. Macerate for 4 hours the pimento and ginger in Oj. of the strained juice, and filter; boil down the rest of the juice to Oiss. and with sugar, ℥iv., form the whole into a syrup). Dose, fʒss. to fʒj.

RHEUM, D. L. E. *Rhubarb*; *Root of an undetermined species of Rheum*, D. E.—*Root of Rheum palmatum*, L. The exact species of the genus *Rheum*, from which the different varieties of *Rhubarb* met with in commerce are obtained, is as yet unknown. They inhabit the northern regions of Asia, from the shores of the Caspian Sea to the Chinese wall, and are cultivated in most of the countries of Europe. The genus is placed in the Natural family *Polygonaceæ*,
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and in the Linnæan class and order *Enneandria Monogynia*. Besides the species mentioned in the London Pharmacopœia, and which Guibourt and Pereira affirm is that which yields the true drug, the following have been referred to by different authorities as yielding rhubarb of one kind or another; viz.—*R. australe*; *R. rhaponticum*; *R. compactum*; *R. Emodi*; *R. Webbianum*; *R. spiciforme*; *R. Moorcroftianum*; *R. crassinervium*; *R. leucorrhizum*, &c.

BOTANICAL CHARACTERS.—All the species are characterized by having a perennial root, which sends up annual root leaves, usually very large, deeply incised and wavy at the edges, generally cordate; a herbaceous flowering stem, from two to four feet high; Flowers small, calyx, petaloid, six-parted, withering.

PREPARATION.—The root is dug up when the plant is five or six years old, washed, scraped, and cut into various sized pieces to facilitate the drying; the pieces are then pierced, strung upon cords, and dried differently in various localities; sometimes on stone tables heated beneath by a fire, sometimes in the sunshine, sometimes slowly under sheds by a current of air, while in Tartary, the Moguls are said to hang them about their tents or on the horns of their sheep.

PHYSICAL PROPERTIES.—Three varieties of rhubarb are ordinarily met with in British trade, each of which we shall consider separately, viz.—Russian, Chinese or East Indian, and English Rhubarb.

1. **RUSSIAN RHUBARB**; *Turkey Rhubarb*; it is met with in irregular shaped pieces, from an inch to three inches in breadth, roundish, sometimes flattened on one side, angular, heavy, of a bright-yellow colour, without any traces of epidermis; generally perforated with conical, not cylindrical holes, in some pieces extending completely, in others only partially through their substance; internally they are compact, beautifully marbled with yellow, red, and white streaks or points. The odour is strong and peculiar; the taste is bitter and faintly astringent; chewed it feels gritty under the teeth, owing to the presence of crystals of the oxalate of lime, and it tinges the saliva yellow; it may be readily pulverized; the powder is of a bright yellow colour. This description of rhubarb is collected by the Bucharrians on the mountains of Tartary, brought by them to the Russian town of Kiachta for barter, whence it is conveyed to St. Petersburg, where it is sorted, packed into boxes or cases which are covered on the outside with a hide, and then exported to the different countries of Europe and to the British Isles.

2. **CHINESE, OR EAST INDIAN RHUBARB**, is met with in globular or flat pieces, rounded, not angular on the surface, of a brownish-yellow colour, usually presenting some traces of epidermis; somewhat heavier than Russian rhubarb; perforated with cylindrical holes, in many of which are found pieces of cord by which the roots were suspended while being dried; internally they are close and compact, marbled and spotted yellowish-brown and whitish; the odour is somewhat stronger than that of Russian rhubarb, the taste similar; the powder is not of so bright a colour. This description is the product of the northern provinces of China; it is imported in chests directly from Canton or by way of Singapore.

3. **ENGLISH RHUBARB.** Two kinds are commonly met with.—

1st. *Stick Rhubarb*; which occurs in pieces about five or six inches long, and half an inch in diameter, round, striated, of a dirty-yellowish-brown colour externally, blackish internally with reddish streaks; its odour is faint, and its taste astringent, not gritty.—2nd. *Trimmed Rhubarb*; this sort is often sold for Turkey rhubarb, which it is prepared to represent; its texture, however, is in general soft and spongy, it has a pinkish hue, is mucilaginous, and is pulverized with difficulty; its taste is astringent, its odour faint, and it is not gritty under the teeth, containing but few crystals of oxalate of lime.

The following sorts of rhubarb are of such rare occurrence in the English market, that a mere mention of them will suffice:—*French rhubarb*, *Bucharian rhubarb*, *Siberian rhubarb*, *Canton-stick rhubarb*, and *Himalayan rhubarb*.

CHEMICAL PROPERTIES.—According to the most complete analysis, that of Brandes in 1836, rhubarb consists of a peculiar principle, named by him *Rhabarberic acid* (*Rhein*, *Rheumin*, *Rhabarberin*, *Caphopicrite*, *Chrysophanic acid*, of other chemists), gallic and tannic acids, uncrystallizable sugar, starch, gummy extractive, colouring extractive, pectic acid, mallate and gallate of lime, oxalate of lime, inorganic salts, silica, iron, and woody fibre. *Rhabarberic acid*, the active principle of rhubarb, was obtained by its discoverer in the proportion of 2 per cent. in a pure, and 10 per cent. in an impure form. Rhubarb yields its active principles to both cold and boiling water, to proof spirit, to alcohol, and to ether.

Adulterations.—The inferior sorts, especially British rhubarb, are frequently mixed with, or substituted for, the finer kinds; the fraud may be detected by attending to the characters given above for the different varieties. Powdered Turkey or East India rhubarb, is very generally adulterated with British rhubarb; the sophistication is difficult of detection, but the fresh powder of the finer sorts is always of a *bright yellow colour*.

THERAPEUTICAL EFFECTS.—Rhubarb acts upon the whole tract of the digestive canal as a mild tonic, cathartic, and astringent. In small doses, it manifests its tonic properties only, promoting the digestive process, as indicated by increased appetite and an improvement in the quality of the alvine secretions. In full doses, it operates as a mild cathartic, stimulating to increased activity the muscular coat of the whole of the intestinal canal, more especially that of the duodenum, but scarcely, if at all, augmenting the secretions. Its astringent property is manifested after the cathartic action has ceased, constipation usually following its purgative effects. The combination of these properties, as well as the safety and mildness of its operation, renders rhubarb a remedy of much value in many diseases. Thus in the treatment of the early stages of the *diarrhœa of irritation*, it is the most efficacious purgative we can employ; it is also peculiarly adapted as a cathartic for infancy and childhood, and as a general laxative for persons with enfeebled digestion, and in all cases of debility of the digestive organs. For the same reasons

rhubarb is inadmissible in the treatment of febrile and inflammatory affections. Rhubarb is absorbed in the course of its operation, and its peculiar odour and yellow colouring matter may be recognised in the urine, in the sweat, in the serum of the blood, and in the milk of nurses, to the latter of which it imparts a purgative property.

DOSE AND MODE OF ADMINISTRATION.—In powder, as a stomachic tonic, gr. v. to gr. x.; as a cathartic, ℥j. to ℥ij. A few drops of the essential oil of nutmegs rubbed up with powdered rhubarb mask its disagreeable odour.—*Pulvis Rhei compositus*, D. E. (“Take of rhubarb, in fine powder, two ounces; magnesia, six ounces; ginger, in fine powder, one ounce: Mix thoroughly by trituration, pass the powder through a fine sieve, and keep it in well-closed bottles,” D.—“Magnesia, ℔j.; ginger, in fine powder, ℥ij.; rhubarb, in fine powder, ℥iv.; mix thoroughly, and preserve in well-closed bottles,” E.). A useful antacid purgative, commonly known as *Gregory's powder*; Dose, for children, gr. v. to gr. xij.; for adults, ℥ss. to ℥j.—*Extractum Rhei*, D. E. (Rhubarb, (in thin slices, D.), ℔j.; water, Ov.; cut the rhubarb into small fragments, macerate for 24 hours in Oij. of the water; filter through a cloth, express (moderately, E.); macerate the residuum with the rest of the water for 12 hours, filter through the cloth previously used and express the residuum strongly. The liquors, again filtered if necessary, are to be mixed and evaporated to a proper consistence in a water bath (vapour bath, E.).—L. (Rhubarb, powdered, ℥xv.; proof spirit, Oj.; distilled water, Ovij.; macerate for four days with a gentle heat, filter, and allow the dregs to subside; pour off the clear liquor and evaporate when strained, to a proper consistence). Dose, gr. x. to ℥ss.—*Pilulæ Rhei*, E. (Rhubarb, in fine powder, 9 parts; acetate of potash, 1 part; conserve of red roses, 5 parts; beat into a proper mass). Dose, gr. v. to gr. xv.—*Pilulæ Rhei compositæ*, D. L. E. (“Take of rhubarb, in fine powder, one ounce and a half; hepatic aloes, in fine powder, nine drachms; myrrh, in fine powder; Castile soap, of each, six drachms; oil of peppermint, one fluid drachm; treacle, *by weight*, two ounces: reduce the soap to a fine powder, and triturate it with the rhubarb, aloes, and myrrh; then add the treacle and oil of peppermint, and beat the whole into a uniform mass,” D.—“Rhubarb, in fine powder, ℥j. (12 parts, E.); aloes, powdered, ℥vj. (9 parts, E.); myrrh, powdered, ℥ss. (6 parts, E.); soap, ℥j. (6 parts, E.); (oil of caraway, f℥ss., L.; oil of peppermint, 1 part, E.); (syrup, q. s., L.; conserve of red roses, 5 parts, E.); mix and beat together till incorporated,” L. E.; “and divide into five-grain pills. This pill may be also made without oil of peppermint, when so preferred,” E.). One of our most valuable pill masses; mildly tonic and purgative; Dose, gr. v. to ℥j.—*Pilulæ Rhei et Ferri*, E. (Dried sulphate of iron, 4 parts; extract of rhubarb, 10 parts; conserve of red roses, 5 parts; beat them into a proper mass and divide it into five-grain pills.) Tonic and laxative, useful in chlorosis; Dose, gr. x. to gr. xv.—*Infusum Rhei*, D. L. E. (Rhubarb,

sliced (in coarse powder, E.), ʒij. (ʒiij. L. ʒj. E.); boiling (distilled, L.) water, fʒix. (Oj. L.; fʒxviiij. E.); macerate (infuse, D.) for 1 (2, L.) hour in a covered vessel (12 hours, and add fʒij. of spirit of cinnamon, E.), and strain; "the product should measure about fʒviiij.," D.). Stomachic and very mildly laxative, a useful vehicle for more active purgatives, Dose, fʒss. to fʒij.—*Tinctura Rhei*, E. (Rhubarb, in moderately fine powder, ʒiiiss.; cardamom seeds, bruised, ʒss.; proof spirit, Oij.; mix the rhubarb and cardamoms, and proceed by the process of percolation as directed for tincture of cinchona; or it may be prepared by digestion). A cordial purgative, employed as an addition to cathartic mixtures in doses of fʒj. to fʒiij.—*Tinctura Rhei composita*, D. L. (Rhubarb, bruised, ʒij. (sliced, ʒiiiss., L.); liquorice root, bruised, ʒss. (ʒvj., L.); saffron, chopped fine, ʒij. (ʒiij., L.); (cardamom seeds, bruised, ʒj., D.; ginger, sliced, ʒiij., L.); proof spirit, Oij.; macerate for 14 days (strain, express, D.) and filter). Uses and dose same as last preparation.—*Tinctura Rhei et Aloes*, E. (Rhubarb, in moderately fine powder, ʒiss.; Socotrine or East Indian aloes, in moderately fine powder, ʒvj.; cardamom seeds, bruised, ʒv.; proof spirit, Oij.; mix the powders and proceed as for tincture of cinchona). A cordial purgative; Dose, fʒss. to fʒj.—*Vinum Rhei*, D. E. ("Take of rhubarb, in coarse powder, three ounces; canella, in coarse powder, two drachms; sherry wine, two pints: macerate for fourteen days, with occasional agitation; then strain with expression, and filter," D.—"Rhubarb, in coarse powder, ʒv.; canella, in coarse powder, ʒij.; proof spirit, fʒv.; sherry, Oj. fʒxv.; digest for 7 days, strain, express strongly, and filter," E.). Stomachic and purgative; Dose, fʒij. to fʒj.—*Syrupus Rhei*, (Rhubarb, 90 parts; cold water, 500 parts; macerate for 12 hours, strain with expression, filter, and dissolve in the liquor twice its weight of sugar). Dose, fʒss. to fʒj.

INCOMPATIBLES.—*With the infusion*—Ammonia; carbonate of potash; lime water; the mineral acids; acetate of lead; tartar emetic; corrosive sublimate; the sesquisalts of iron; and astringent vegetable infusions or decoctions.

RICINI OLEUM, D. L. E. *Castor oil; Oil expressed from the seeds of Ricinus communis.* The castor oil tree is a native of Africa and the East Indies; it is cultivated at present very extensively in the West Indies, and in North and South America; it also grows in the South of Europe and in the British Isles. It belongs to the Natural family *Euphorbiaceæ*, and to the Linnæan class and order *Monœcia Monadelphica*.

BOTANICAL CHARACTERS.—In northern countries, a herbaceous annual seldom exceeding 3 or 4 feet in height, in warm climates it becomes an aborescent perennial, attaining a height of 20 to 30 feet; Leaves, large, of a dull green colour, shining, palmate, deeply cut into acute lobes, serrated; Flowers, in terminal panicles, glaucous-green, monœcious; Fruit, a three-celled capsule covered with spines, each cell containing one

seed ; the seeds are oval, about three lines broad, four lines long, and a line and a half thick ; the seed-coat is pale grey, marbled with blackish and yellowish-brown spots and stripes ; it encloses a thick, fleshy, oily nucleus, within which is a large, dicotyledonous leafy embryo.

PREPARATION.—The fixed oil of the seeds, which alone is officinal, is obtained by expression with or without the aid of heat, the seed coats being usually first removed ; that obtained without heat is called *cold drawn castor oil*, and bears the highest character. This is the process followed in the West Indies, and for the finer qualities of oil in the East ; more generally, however, in the East Indies, the seeds are boiled in water, dried and bruised, and again boiled in water till the oil separates and floats on the surface. In North America, the seeds are heated and pressed, and the oil thus obtained is boiled with water to free it from impurities. The seeds yield about 30 per cent. of oil.

PHYSICAL PROPERTIES.—Castor oil is a viscid oily liquid, of a very pale straw colour (inferior sorts are deep yellow), having a faint, slightly nauseous odour, and a mild greasy taste. Specific gravity, 0·964.

CHEMICAL PROPERTIES.—According to the analysis of Bussy and Lecanu, it is a compound of, or rather is converted by distillation into three fatty acids, *ricinic*, *elaïodic*, and *margaritic* ; but the source of its laxative properties has not been as yet discovered. Its ultimate constituents according to Ure, are 74 per cent. of carbon, 10·29 of hydrogen, and 15·71 of oxygen. Exposed to a cold a little below 32°, it becomes thick and turbid, at 0° it congeals into a transparent yellow mass ; by exposure to the air it thickens and dries without becoming opaque, and hence is called a *drying oil* ; it is decomposed by a heat above 500°. Castor oil is soluble in ether and in cold alcohol ; the latter property is not possessed by any other fixed oil with which we are acquainted except concrete palm oil, and, according to Pereira, British expressed croton oil (See p. 98.). East Indian castor oil is the kind principally employed at present in the British Isles ; West Indian castor oil is not imported ; and American castor oil is but little esteemed by druggists, (although equally efficacious as a medicine and free from any unpleasant flavour), in consequence of its becoming turbid in cold weather and throwing down a copious deposit of white fatty crystals.

Adulterations.—The adulteration of castor oil with other fixed oils, a fraud more frequently practised in former days than at present, may readily be detected by its solubility in alcohol ; pure castor oil being entirely dissolved by its own volume of alcohol. It should also be free from any rancid odour, or acrid taste.

THERAPEUTICAL EFFECTS.—Castor oil is a mild but effectual cathartic, operating soon after it has been taken, without pain or uneasiness, producing three or four thin, feculent, not watery evacuations ; these properties adapt it for all cases in which we desire to evacuate the contents of the intestinal canal, without producing abdominal irritation or general disturbance of the system. The only objection to its employment is its disagreeable greasy taste, in consequence of which it frequently occasions nausea and vomiting. The following are a few of the cases in which its use as a cathartic is particularly indicated : inflammatory or spasmodic diseases of the

intestinal canal or of the urino-genital apparatus; hemorrhoidal affections; stricture of the rectum; during pregnancy and after delivery; in diseases of infancy and childhood; after surgical operations about the pelvis or abdomen, &c. If castor oil be at all rancid it becomes very acrimonious, causing much irritation, and sometimes even troublesome diarrhœa.

DOSE AND MODE OF ADMINISTRATION.—fʒss. to fʒij., by the mouth or in the form of enema; it is best taken floating on the surface of water to which some aromatic tincture, as of cascarrilla or of orange peel, has been added; or it may be made into an emulsion with yolk of egg or with mucilage. M. Parola has recently proposed the substitution of an ethereal or alcoholic tincture of castor-oil seeds for the oil itself. He states as the result of numerous trials he has made, that the tinctures are four times as strong as the oil, than which they are less irritant and less apt to produce vomiting. The tinctures (for which M. Parola does not give any formula) may be readily prepared by macerating ʒviiij. of the fresh seeds, freed from the seed-coats and bruised, in Oj. of rectified spirit or of ether for 7 days and filtering; the dose of either would be from fʒij. to fʒiiij.—*Castor oil purgative emulsion*, (Castor oil, fʒj.; yolk of egg, 1; mint water, fʒss.; water, fʒij.; simple syrup, fʒj.; mix). Sufficient for one dose.—*Castor oil draught*, RIGHINI. (Gum arabic, in fine powder, ʒij.; pure water, fʒiiij.; make a mucilage with a small quantity of the water; and add, of castor oil, fʒj.; mix carefully and pour in the rest of the water with constant agitation; and finally add the filtered juice of one orange and fʒj. of simple syrup). The nauseous taste of the oil is completely concealed in this draught, the only objection to which is its bulk.

SCAMMONIUM, D. L. E. *Scammony*; *Gum-resin obtained from Convolvulus scammonia*. A native of Greece, and various parts of the Levant, where it is found growing in hedges and bushy places. It is placed in the Natural family *Convolvulaceæ*, and in the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Root, very thick, fusiform, fleshy, abounding in a milky juice; Stems, smooth, herbaceous, climbing; Leaves, pointed, hastate; Flowers, on long, solitary peduncles, yellowish, with purple stripes.

PREPARATION.—The inspissated juice of the root, which constitutes scammony, is procured as follows:—The earth having been cleared away, the top of the root is sliced off obliquely about two inches below where the stems spring from it; as the juice flows out, it is received in shells and exposed to the air until it thickens; each root, although generally four feet in length, and three or four inches in diameter, yields only about two drachms of scammony.

PHYSICAL PROPERTIES.—Fine scammony, *Virgin scammony*, is in amorphous masses, weighing from two ounces to half a pound each, very porous, friable, and of an ash-grey colour externally; its fracture is conchoidal, very resinous, porous, and of a dark greenish-

black colour; the odour is strong, peculiar, resembling somewhat that of old cheese, heightened by being breathed on, and the taste is acrid and nauseous; specific gravity, 1·210. This variety of scammony is scarce, and when met with bears a very high price. Scammony as it commonly occurs is an impure article, usually imported in boxes or drums, seldom in cakes; it is heavier than virgin scammony, more compact, and of a pale ash-grey colour; its fracture is earthy, dull, not porous, and of a greyish-black colour, in some specimens presenting numerous white specks (chalk); its odour and taste are the same as of pure scammony; specific gravity, from 1·276 to 1·543.

CHEMICAL PROPERTIES.—According to Christison's analysis, fine specimens of virgin scammony consist of 81 to 83 per cent. of resin, 6 to 8 per cent. of gum, and some woody fibre, sand, moisture, and sometimes a trace of starch. In the best specimens which I have had an opportunity of examining, I have found but 76 per cent. of resin. The resin is the active principle of the drug; it may be readily obtained by treating scammony with sulphuric ether and evaporating to dryness, or by the process of the Edinburgh Pharmacopœia, given below; in mass it is of a reddish-yellow colour, clear, and semitransparent, its powder is pale straw colour, it is void of odour and taste when quite pure. It is soluble in alcohol, ether, and oil of turpentine, and forms with unskimmed milk a fine uniform emulsion. By the latter characteristic and also by its solubility in oil of turpentine it is distinguished from resin of jalap.

Adulterations.—No drug is more generally and more uniformly adulterated than scammony; it is indeed very difficult to meet with it in a perfectly pure state. And to so great an extent is the adulteration practised, that in many specimens which I have examined I have frequently found not more than from 28 to 35 per cent. of resin present. The substances used to adulterate the drug are chalk and flour, either separately or conjointly, guaiacum resin and gum tragacanth. Chalk and flour may be readily detected; the former, by the effervescence produced when hydrochloric acid is dropped on a small fragment; the latter by a cooled and filtered decoction of the powder being rendered blue by tincture of iodine. The adulteration with guaiacum resin has been practised only within the last few years, but I have recently met with it in many samples. Its presence may be discovered by pouring a few drops of an alcoholic tincture of scammony on the fresh-cut surface of a raw potato, when if guaiacum be present, a blue colour will be produced; or by exposing paper moistened with the tincture to nitrous acid fumes (obtained by pouring a little nitric acid over some slips of copper), which will be rendered blue if this fraud had been practised. I have never found tragacanth in scammony, but this sophistication is stated to have been recently detected in one instance. It may be discovered by first separating the resin with sulphuric ether, and then treating the residue with cold water, when if any gum tragacanth be present a thick mucilage will be formed.

THERAPEUTICAL EFFECTS.—Scammony, when pure, is a powerful

cathartic, operating as a direct irritant to the intestinal mucous membrane, and producing copious watery evacuations. It is well adapted for cases of habitual constipation arising from a torpid state of the intestinal canal, in passive dropsies, in apoplectic affections, and as an active purgative for children, for whom it is beneficially combined with calomel. If there be any tendency to inflammation of the digestive organs, scammony is contraindicated as a cathartic. From the difficulty of procuring the drug in a pure state, scammony has of late years fallen into much disrepute.

DOSE AND MODE OF ADMINISTRATION.—In powder, if the scammony be pure, for an adult, gr. viij. to gr. x., but as usually met with, double that quantity; it should be prescribed in combination with some bland powder, or made into an emulsion with milk.—*Pulvis Scammonii compositus*, D. L. (“Take of scammony, in fine powder, one ounce; compound powder of jalap, three ounces. Mix thoroughly by trituration, and pass the powder through a fine sieve,” D.—“Scammony; hard extract of jalap, of each, ʒij.; ginger, ʒss.; rub separately to very fine powder, and mix,” L). Dose, for an adult, gr. x. to gr. xx.; for a child, gr. iij. to gr. v.—*Extractum, sive, Resina Scammonii*, E. (Take any convenient quantity of scammony in fine powder, boil it in successive portions of proof spirit, till the spirit ceases to dissolve anything, filter, distil the liquid till little but water passes over, then pour away the watery solution from the resin at the bottom, agitate the resin with successive portions of boiling water till it is well washed, and lastly, dry it at a temperature not above 240°). The resin of scammony is a most valuable preparation, and especially adapted for children in consequence of the tasteless form in which it may be administered. Dose, gr. ij. to gr. v.; best administered according to the following formula.—*Mistura Scammonii*, E. (Resin of scammony, gr. viij.; unskimmed milk, fʒij.; triturate the resin with a little of the milk, and gradually with the rest of it till a uniform emulsion be obtained). Intended for one dose for an adult, but much too powerful; I have always found gr. v. triturated with the same quantity of milk sufficient for the most obstinate bowels. This mixture cannot be distinguished either by smell or taste from rich new milk, and consequently forms a very convenient purgative for children in doses of fʒss. to fʒiss.—*Confectio Scammonii*, D. L. (“Take of scammony, in fine powder, three ounces; ginger, in fine powder, one ounce and a-half; oil of caraway, one fluid drachm; oil of cloves, half a fluid drachm; simple syrup, three fluid ounces; clarified honey, *by weight*, one ounce and a-half: beat the powders with the syrup and honey into a uniform mass, then add the oils, and mix all well together,” D.—“Scammony, powdered, ʒiss.; cloves, bruised; ginger, powdered, of each, ʒvj.; oil of caraway, fʒss.; syrup of roses, q. s.; rub the dry ingredients together to very fine powder, and preserve them; then, whenever the confection is to be used, the syrup being gradually poured in, rub again; lastly, the oil of caraway being added, mix them all,” L). A stimulating cathartic,

but seldom used, yet it forms a good addition to purgative draughts containing the neutral salts. Dose, for an adult, ʒss. to ʒj.; for children, gr. v. to gr. xij.—*Scammony biscuits*, (Scammony resin, in fine powder, ʒj.; castile soap, gr. v.; white sugar, ʒij.; reduce to a fine powder and mix intimately with ʒj. of powdered biscuit; make into a stiff paste with a few drops of water; divide into portions of ʒj. each, and dry in the air.) Each drachm contains gr. vj. of scammony resin.

INCOMPATIBLES.—All acids.

SENNA, L. *Leaves of Cassia lanceolata and Cassia obovata*, L.—*Senna Leaves*.

SENNA ALEXANDRINA, D. E. *Leaves of Cassia acutifolia*, D.—*Of various species of Cassia, probably of Cassia lanceolata, of C. acutifolia, and of C. obovata; Alexandrian senna. As imported it also contains an abundant admixture of leaves of Cynanchum Argel, which ought to be removed as far as possible by picking*, E.

SENNA INDICA, D. E. *Leaves of Cassia elongata; East Indian Senna, var. Tinnivelly*.

Some confusion still exists as to the species of the genus *Cassia* which yield the senna leaves of commerce. The various species are inhabitants of the North of Africa, particularly Egypt, of Arabia, and of the Indian peninsula, where probably it has been introduced, and is now naturalized; they are also cultivated in the South of Europe, and in some of the West Indian Islands. The genus belongs to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley,) and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL CHARACTERS.—Shrubs or herbs, frequently annual; Leaves, simply and abruptly pinnate; petioles, frequently glanduliferous; Leaflets opposite; Sepals, five, more or less unequal; Petals, five, unequal; Stamens, ten, free, unequal; Ovary, stalked, frequently arched; Legumes, various.

PREPARATION.—Senna leaves are gathered by the Arab tribes in Ethiopia, Arabia Felix, Abyssinia, Nubia and Sennaar, where the shrub is chiefly indigenous. The harvest begins about the end of September; the branches are cut off the trees and exposed to the sun until the leaves begin to fade, when they are placed on high ground and on rocks, so as to be dried as quickly as possible. When quite dry, the branches are laid in heaps and beaten with sticks until the leaves fall off. No account of the method followed in India for the preparation of senna has been yet published; but it is probably similar to that used in Egypt.

PHYSICAL PROPERTIES.—Three sorts of senna are commonly known in the English Market, Alexandrian senna, Tripoli senna, and East Indian senna. 1st.—ALEXANDRIAN SENNA, the produce of Nubia and Upper Egypt, is imported in large bales and barrels from Alexandria; it consists of greyish-green leaflets usually much broken, mixed with the flowers and fruits of the various species from which it is obtained; there is also a large quantity, generally about a tenth of the weight, of the leaves, flowers, and fruit of the *Cynanchum Argel*; and sometimes a considerable number of pods,

with a few leaves of the *Tephrosia apollinea*. The odour of Alexandrian senna is nauseous, but resembles in some respects that of tea; the taste is viscid and nauseous. 2nd.—TRIPOLI SENNA; it scarcely differs from that just described, for which it is indiscriminately sold; the leaflets are perhaps more broken down, smaller and of a greener colour, it seldom contains either *Cynanchum* or *Tephrosia* leaflets. 3rd.—EAST INDIAN SENNA, *Tinnivelly senna*; this occurs in large unbroken leaflets, from one to two inches long, and half an inch broad, thin and flexible, and of a fine green colour, many of the leaflets, however, are blackish, probably from imperfect drying; both odour and taste are similar to, but a little weaker than Alexandrian senna.

CHEMICAL PROPERTIES.—According to MM. Lassaigne and Feneulle, Alexandrian senna is composed of *cathartin*, chlorophylle, yellow colouring matter, mucus, albumen, malic acid, and some salts. *Cathartin*, supposed to be the purgative principle, is an uncrystallizable, deliquescent substance with a peculiar odour, and a bitter nauseous taste; it is soluble in water and in alcohol, but insoluble in ether. The experiments of Christison on this substance prepared by himself, would appear to show that it is nearly if not altogether inert, and, therefore, cannot be the active principle of senna. Senna leaves yield their active properties to both cold and warm water, to proof spirit and to alcohol; warm water extracts about a third of the weight of the leaves.

Adulterations.—In Egyptian senna, as met with in British commerce, the only adulteration that is practised has been before indicated, namely with Argel, and sometimes with *Tephrosia* leaflets. The former are readily distinguished by their paler yellowish colour, their coriaceous texture, their under surface being reticulated with veins, their upper surface somewhat rugose, and by their being equal-sided; the leaflets of all the true sennas being unequal at the base. *Tephrosia* leaflets are easily known by their silky surface, and by the lateral veins proceeding parallel to each other to the very edge of the leaf without ramifying. Two other adulterations are common on the continent, but have never been met with, as far as I am aware, in the British market; one is with the leaflets of the *Colutea arborescens* or bladder senna, which may be at once distinguished by their regularity at the base; the other, perhaps a more serious fraud, in consequence of the supposed poisonous property of the substance employed, is with the leaflets of the *Coriaria Myrtifolia*; they are known by presenting three very prominent longitudinal nerves, and chemically by their infusion producing with solution of sulphate of iron, a blackish precipitate (*tannate of iron*), and with gelatin a heavy whitish precipitate, (*tannate of gelatin*). Senna adulterated with the leaves of the *Vaccinium vitis-idaea*, containing so much as 75 per cent. of them, has recently occurred in the French market; the fraud is one easily detected by the character of the leaves, particularly by the reticulated surface of the latter.

THERAPEUTICAL EFFECTS.—Senna is an active cathartic, holding a middle place between the milder and more active medicines of this class; operating effectually, yet safely, though often producing nausea, griping and flatulence; its action is somewhat stimulating, increasing the secretions, and exciting the peristaltic action chiefly, but not alone, of the small intestines. It is adapted for all cases requiring an effectual purgative; but it should be combined with the active saline cathartics for which the infusion is a good vehicle, if it be wished to diminish arterial action or produce general antiphlogistic effects. The only circumstance contra-indicating its employment is an inflammatory condition of the mucous membrane of the alimentary canal. The cathartic principle of senna is absorbed before its operation is produced, as is proved by its action on the intestines when the infusion is injected into the veins, and also by its imparting a purgative property to the milk of nurses.

DOSE AND MODE OF ADMINISTRATION.—Senna is not administered in the form of powder; ʒij. to ʒss. infused in fʒij. of boiling water for half an hour and the clear infusion poured off, will be sufficient for a dose; its taste is much concealed by the addition of some black tea, and it may be sweetened with sugar, and milk added; in this way it is readily taken by children.—*Infusum Sennæ compositum*, D. L. *Infusum Sennæ*, E. (Senna leaves, ʒss. (ʒxv. L. ʒiss. E.); ginger, sliced, ʒss. (ʒiv. L. E.); boiling (distilled, L.) water, Oss. (Oj. L. E.); macerate (infuse, D.), for an hour in a close vessel and strain “through linen or calico;” E. “The product should measure about fʒviij.” D.). Dose, fʒij. to fʒiv. The common cathartic mixture, *Black Draught*, of hospitals, is prepared by adding ʒj. of sulphate of magnesia to fʒiv. of this infusion.—*Infusum Sennæ compositum*, E. (Senna, ʒj.; tamarinds, ʒj.; coriander, bruised, ʒj.; muscovado, ʒss.; boiling water, fʒviij.; infuse for four hours in a covered vessel, not glazed with lead, and then strain through linen or calico; it may be made with twice or thrice the senna prescribed). An excellent cathartic infusion; Dose, fʒij. to fʒiv.—*Syrupus Sennæ*, L. (Senna, ʒiiss.; fennel, bruised, ʒx.; manna, ʒiij.; sugar, ʒxv.; boiling water, Oj.; macerate the senna and fennel in the water, with a gentle heat, for an hour; strain; add the manna and sugar, and boil down to a proper consistence).—E. (Senna, ʒiv.; boiling water, fʒxxiv.; treacle, ʒxlviij.; infuse the senna in the water for twelve hours, strain and express strongly; concentrate the treacle in a vapour bath as far as possible, or till a little taken out on a rod becomes nearly concrete on cooling, and while the treacle is still hot add the infusion; stirring carefully, and removing the vessel from the vapour-bath as soon as the mixture is complete. If Alexandrian senna be used for this preparation, it must be carefully freed of *Cynanchum* leaves). An agreeable cathartic for children, in doses of from fʒj. to fʒiv., or as an addition to cathartic mixtures for adults, in doses of fʒss. to fʒj.—*Confectio Sennæ*, D. (Take of senna, in fine powder, two ounces; coriander, in fine powder, one ounce; oil of caraway, half a fluid drachm; pulp of prunes, five ounces; pulp of

tamarinds, two ounces; brown sugar, eight ounces; water, two ounces; dissolve the sugar in the water, and beat the pulps with the syrup to a uniform consistence; having stirred in the powders and oil of caraway, mix all well together, and heat the mass thoroughly in a water bath for ten minutes).—*Electuarium Sennæ*, E. *Confectio Sennæ*, L. (Senna, ℥viij. ; figs, ℔j. ; (tamarind pulp, and cassia pulp, of each, ℔ss. L.); prunes, ℔ss. (℔j. E.); coriander, ℥iv. ; liquorice-root, (bruised, E.), ℥ij. ; sugar, ℔iiss. ; water, Oij. ; powder together the senna and the coriander, and sift out ℥x. ; boil the figs and the liquorice (the residue, E.) in the water to half; squeeze and strain; evaporate in a water-bath down to f℥xxiv. ; form a syrup by adding the sugar; add the syrup to the prunes (and other pulps, L.), throw in the sifted powder, and mix all). Commonly known as *lenitive electuary*, a mild but efficacious compound in doses of ℥ij. to ℥ss. ; generally badly prepared, and very liable to adulteration, the true preparation being both troublesome and expensive.—*Tinctura Sennæ composita*, D. L. (Senna ℥iv. (℥iiss. L.); caraway seeds, bruised, ℥ss. (℥iiss. L.); cardamom seeds, bruised, ℥ss. (℥j. L.); (raisins, ℥v. L.); proof spirit, Oij. ; macerate for 14 days and strain (strain, express and filter, D.)—E. (Sugar, ℥iiss. ; coriander, bruised, ℥j. ; jalap, in moderately fine powder, ℥vj. ; caraway, bruised; and cardamom seeds, bruised, of each, ℥v. ; raisins, bruised; and senna, of each, ℥iv. ; proof spirit, Oij. ; digest for seven days, strain, express and filter; may be more conveniently and expeditiously made by percolation, as directed for compound tincture of cardamoms; if Alexandrian senna be used, it must be freed from *Cynanchum* leaves by picking). A stimulating and cordial cathartic, in doses of f℥ss. to f℥j. , only fit for cold leucophlegmatic habits; more generally prescribed as an adjunct to infusion of senna, or other cathartic mixtures, in doses of f℥j. or f℥ij. to correct their griping qualities.—*Fluid extract of Senna*, DUNCAN. (Tinnivelly senna, ℔xv. ; exhaust with boiling water by displacement—about four times its weight of water is sufficient; concentrate the infusion *in vacuo* to ℔x. ; dissolve in the product ℔vj. of treacle previously concentrated over the vapour-bath, till a little of it becomes nearly dry on cooling; add of rectified spirit, f℥xxiv. (Dens. $\cdot 835.$), and if necessary add water (℥xvj.) to make Oxv.). Every fluid ounce of this extract corresponds to one *avoirdupois* ounce of senna: the dose is f℥ij. for an adult. This is an excellent preparation, operating effectually, and seldom causing griping or any other annoyance. Alexandrian senna may be used instead of Tinnivelly, the *Cynanchum* leaves having been previously removed by picking.

INCOMPATIBLES.—The mineral acids; lime water; acetate of lead; tartar emetic; corrosive sublimate; and nitrate of silver.

SODÆ HYPOSULPHIS.—*Hyposulphite of soda*; *Sulphuretted sulphite of soda*.

PREPARATION.—Take of carbonate of soda, dried and powdered, 500 parts ; sublimed sulphur, 100 parts ; mix, and heat in a glass or porcelain capsule until the mass is completely fused, stirring constantly so as to expose every part of it to the contact of the air. When cold, dissolve in water, filter, and having added more sulphur, boil for a few moments. Filter again and evaporate with a gentle heat so as to obtain crystals. **WALCHNER.**

PHYSICAL PROPERTIES.—Hyposulphite of soda occurs in beautiful, four-sided prismatic crystals, transparent, inodorous, with a bitter, saline taste.

CHEMICAL PROPERTIES.—It is composed of one equivalent of soda, one of hyposulphurous acid, and ten of water, ($\text{Na O, S}^2 \text{O}^2 + 10 \text{HO.}$) It is soluble in water. Sulphuric acid added to a solution of hyposulphite of soda, disengages sulphurous acid gas and precipitates sulphur.

THERAPEUTICAL EFFECTS.—This salt produces effects very nearly similar to those of sulphate of soda, acting as an active cathartic when given in a sufficient dose. In France it is generally preferred to the other neutral salts as a purgative in cutaneous affections.

DOSE AND MODE OF ADMINISTRATION.—From ʒj. to ʒij. dissolved in water, to which some aromatic tincture is added.

INCOMPATIBLES.—The mineral acids, and most salts.

SODÆ PHOSPHAS, D. L. E. *Phosphate of Soda.*

PREPARATION.—Phosphate of soda is an article of the *Materia Medica* in the London Pharmacopœia ; the processes of the Dublin and Edinburgh Colleges are as follows :—"Take of Ox-bones, burned to whiteness in a clear fire, ten pounds ; oil of vitriol of commerce, fifty-six fluid ounces ; distilled water, four gallons and a half, or a sufficient quantity ; crystallized carbonate of soda of commerce, twelve pounds, or a sufficient quantity : on the bone-earth, reduced to a fine powder, and placed in a large dish of earthenware or lead, pour the oil of vitriol and mix well with a glass or porcelain rod, so that every particle of the powder may be moistened by the acid. After the lapse of twenty-four hours, add gradually, and with constant stirring, one gallon of distilled water, and digest for forty-eight hours, pouring on occasionally a little water, so as to restore what has been lost by evaporation. Add now a second gallon of the water, and, having well agitated the mixture, and continued the digestion for another hour, let the whole be thrown upon a calico filter ; and, when the liquid has ceased to trickle through, let the precipitate be repeatedly washed with boiling distilled water, until the washings, allowed to drop on blue litmus paper, redden it only in a very slight degree. Concentrate the filtered solution and washings to the bulk of one gallon, and, having set it by for twenty-four hours, pass it through a filter. To the filtered solution, raised to the temperature of 212° , gradually add the carbonate of soda previously dissolved in two gallons of boiling water, until the mixture acquires a slight alkaline reaction, and then place the whole upon a calico filter. The clear solution which passes through, when concentrated until a film begins to form on its surface, will, upon cooling, afford crystals of phosphate of soda ; and from the mother liquor an additional product may be obtained by further concentration. The salt, when dried on blotting-paper, should be preserved in a well-stopped bottle," D. "Take of bones burned to whiteness, lbx. ; sulphuric acid, Oij. fʒiv. ; carbonate of soda, a sufficiency ; pulverize the bones and mix them with the acid, add gradually Ovj. of water ; digest for three days, replacing the water which evaporates ; add Ovj. of boiling water, and strain through strong linen ; pass more boiling water through the mass on the filter till it comes away nearly tasteless ; let the impurities subside in the united liquors ; pour off the clear fluid and con-

centrate to Ovj. ; let the impurities again settle, and to the clear liquor which is to be poured off and heated to ebullition, add carbonate of soda previously dissolved in boiling water until the acid be completely neutralized ; set the solution aside to cool and crystallize. More crystals will be obtained by successively evaporating, adding a little carbonate of soda till the liquid exerts a feeble alkaline reaction on litmus paper, and then allowing it to cool," E.

PHYSICAL PROPERTIES.—Transparent, colourless crystals, the form of which is the oblique rhombic prism ; inodorous, with a cooling, saline, not unpleasant taste. Specific gravity, 1.333.

CHEMICAL PROPERTIES.—It is composed of 2 equivalents of soda, 1 of phosphoric acid, 1 of basic water, and 24 of water of crystallization, (HO , 2 Na O, $\text{PO}^5 + 24 \text{HO}$) ; it effloresces and becomes opaque by exposure to the air ; moderately heated it fuses in its water of crystallization, which if the heat be increased is driven off. Phosphate of soda dissolves in four times its weight of cold water, and in twice its weight of boiling water ; the solution has a feeble alkaline reaction, it is nearly insoluble in alcohol.

Adulterations.—This salt is in general tolerably pure ; if the precipitate occasioned in a solution by chloride of barium be not entirely dissolved by nitric acid, a sulphate is present ; and if that caused by nitrate of silver be not dissolved by nitric acid, a chloride is present.

THERAPEUTICAL EFFECTS.—A mild saline cathartic, resembling in its operation the sulphates of magnesia and soda, to either of which it should be preferred for children and delicate persons, in consequence of the mildness of its taste. It is particularly adapted as a cathartic for individuals affected with deposits of uric acid in the urine, as it possesses a remarkably solvent action on that acid.

DOSE AND MODE OF ADMINISTRATION.— ʒiv. to ʒxij. ; it may be given dissolved in water or in any of the cathartic vegetable infusions ; or it is readily taken by children dissolved in broth or soup, to which it imparts only a saline taste.

INCOMPATIBLES.—The mineral acids ; lime water ; magnesia, chloride of barium ; nitrate of silver, and the acetates of lead.

SODÆ ET POTASSÆ TARTRAS, D. E. SODÆ POTASSIO-TARTRAS, L.
Tartrate of Soda and Potash ; Rochelle salt.

PREPARATION.—D. L. E.—“Take of crystallized carbonate of soda of commerce, nine ounces ; white bitartrate of potash, in fine powder, twelve ounces, or a sufficient quantity ; distilled water, half a gallon : dissolve the carbonate of soda in the water, and to the solution, while boiling hot, gradually add the bitartrate, until a neutral solution is obtained. Let this be filtered, evaporate till a pellicle forms on its surface, and then set to crystallize. After twelve hours, the solution should be decanted off the crystals, and these, when dried on blotting paper, should be preserved in a bottle. By further concentrating the decanted solution, and cooling it, an additional crop of crystals may be obtained,” D.—“Carbonate of soda, ʒxij. ; bitartrate of potash, in fine powder, ʒxvj. ; boiling water, Oiv. ; to the carbonate of soda dissolved in the water, add by degrees (to neutralization, E.) the bitartrate of potash ; evaporate the filtered liquor till a pellicle forms on its surface, and set it aside, that as it cools crystals may be formed. Evaporate the liquor again that it may yield crystals,” L. E.

PHYSICAL PROPERTIES.—This salt occurs in large, beautiful, transparent crystals, which are right rhombic prisms, generally produced in halves; inodorous, with a saline, somewhat bitter taste. Specific gravity, 1.757.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of soda, 1 of potassa, 1 of tartaric acid, and 10 of water, (KO , NaO , $\text{C}^8\text{H}^4\text{O}^{10} + 10\text{HO}$). In very dry air it effloresces slightly; exposed to a moderate heat it fuses in its water of crystallization; by a strong heat it is decomposed, and converted into a mixture of charcoal and the carbonates of soda and potash. It dissolves in five parts of cold, and one of boiling water.

As this salt is generally sold in crystals, it is not liable to adulteration.

THERAPEUTICAL EFFECTS.—A mild cooling laxative, not so active as most of the other saline cathartics, than which also its taste is less disagreeable; it is seldom prescribed alone, but is in very general use as the active ingredient in the commonly called Seidlitz (*Seignettes*?) powders.

DOSE AND MODE OF ADMINISTRATION.— $\bar{3}\text{ij}$ to $\bar{3}\text{vj}$. or $\bar{3}\text{j}$. dissolved in a large quantity of water. *Seidlitz powders* consist of $\bar{3}\text{ij}$. of tartrate of soda and potash, and $\bar{9}\text{ij}$. of bicarbonate of soda, reduced to powder and mixed, contained in a blue paper, and $\bar{3}\text{ss}$. of powdered tartaric acid in a white paper; they are taken, dissolved in from a half a pint to a pint of water, while the liquid is in a state of effervescence. They form an agreeable and mild aperient.

INCOMPATIBLES.—Most acids and acidulous salts; lime water; the salts of lime; and the acetates of lead.

SODÆ SULPHAS, D. L. E. *Sulphate of Soda. Glauber's salts.*

PREPARATION.—An article of the *Materia Medica* in the *Dublin Pharmacopœia*. *London.*—"Take of the salt which remains after the distillation of hydrochloric acid, lbij .; boiling water, Oij .; carbonate of soda, a sufficiency; dissolve the salt in the water, then add gradually sufficient carbonate of soda to neutralize the acid; boil down till a pellicle appears, and set aside the strained solution that crystals may be formed; pour off the liquor and dry them." *Edinburgh.*—"Take of the salt which remains after making pure muriatic acid, lbij .; boiling water, Oijj .; white marble, in powder, a sufficiency; dissolve the salt in the water, add the marble so long as effervescence takes place; boil the liquid, and when neutral, filter it; wash the insoluble matter with boiling water, adding the water to the original liquid; concentrate till a pellicle begins to form, and then let the liquid cool and crystallize."

PHYSICAL PROPERTIES.—A solid, white salt, crystallized either in small acicular crystals, or in long prisms, the sides of which are often channeled; inodorous; with a cooling, saline, very bitter taste. Specific gravity, 2.246.

CHEMICAL PROPERTIES.—It is composed of one equivalent of soda, 1 of acid, and 10 of water, (NaO , $\text{SO}^3 + 10\text{HO}$). By exposure to the air it effloresces rapidly, loses all its water of crystallization, and

a white powder is left. Heated it fuses, but at the temperature of 210° it becomes a white solid, which is again liquefied at a red heat, but is not decomposed. Sulphate of soda is soluble in three parts of water at 60° , and in all proportions in boiling water. It is insoluble in alcohol.

THERAPEUTICAL EFFECTS.—An active saline cathartic, increasing remarkably the intestinal secretions; in its mode of operation it resembles sulphate of magnesia, and may be used in the same cases; in consequence, however, of its more disagreeable taste, and its tendency in some habits to produce griping, it is not so frequently employed as that salt.

DOSE AND MODE OF ADMINISTRATION.— $3v.$ to $3x.$ dissolved in from two to four ounces of water; ten or twelve drops of dilute sulphuric acid added to the solution conceal to a great extent its disagreeable taste. The effloresced salt is about twice as active as the crystals.

INCOMPATIBLES.—Carbonate and bicarbonate of potash; the salts of lime, and of baryta; the acetate and diacetate of lead; acetate of potash; and nitrate of silver, if the solution be strong.

SULPHUR SUBLIMATUM, D. L. SULPHUR, E. *Sublimed Sulphur. Sulphur or Brimstone.* An elementary substance found in large quantities in an impure state, in the neighbourhood of volcanoes; it is also found combined with metals in many parts of the earth; and with hydrogen in many mineral waters. Crude sulphur is imported into Britain from Italy and Sicily.

PREPARATION.—Sublimed sulphur is an article of the *Materia Medica* in the Dublin and London Pharmacopœias; in the Edinburgh it is directed to be prepared “by subliming sulphur in a proper vessel, washing the powder thus obtained with boiling water in successive portions till the water ceases to have an acid taste, then drying the sulphur with a gentle heat.”

PHYSICAL PROPERTIES.—Two kinds of sulphur are commonly met with, Roll-sulphur or Brimstone, and Flowers of Sulphur or Sublimed Sulphur. *Roll-sulphur* is in cylindrical pieces from two to three inches long, and nearly an inch in diameter, obscurely crystallized in the centre, crackling when held in the warm hand, very friable, and breaking with a shining crystalline fracture. *Sublimed sulphur* is in the form of a fine powder, which when examined by the microscope, is seen to be composed of crystalline grains; both kinds are of a bright, yellowish-green colour, with an almost imperceptible taste, and a faint peculiar odour when rubbed. Specific gravity 1.98. Atomic weight, 16.

CHEMICAL PROPERTIES.—Sulphur is a simple substance, insoluble in water and in alcohol. It fuses at 226° , and between that temperature and 280° , it forms a clear liquor of an amber colour; at 320° it thickens, assumes a reddish tint, and if the heat be con-

tinued, becomes a thick tenacious mass; from 482° to its boiling point 601°, it becomes again more fluid, and finally rises in vapour before it is completely fused. Sulphur, if ignited, burns with a lambent blue flame, and is converted into sulphurous acid gas.

Adulterations.—Flowers of sulphur seldom contain any impurities; those of a fixed nature may be detected by subliming; if any adhering sulphuric acid be present, distilled water agitated with the sulphur reddens litmus paper. Roll-sulphur usually contains a large quantity of orpiment (*sesquisulphuret of arsenicum*), and therefore should not be used in medicine.

THERAPEUTICAL EFFECTS.—In large doses, sulphur acts as a mild cathartic, producing its effects by stimulating the muscular coat of the intestines, the evacuations caused by it being usually solid. In consequence of the mildness, but certainty of its operation, it is generally employed in hemorrhoidal diseases, and in stricture or other painful affections of the rectum. From being converted into sulphuretted hydrogen in the intestines, the evacuations and the insensible perspiration of the individual, during and for some time after its operation, are insupportably fetid.

DOSE AND MODE OF ADMINISTRATION.—As a cathartic, ʒiij. to ʒiv. made into an electuary with honey or treacle; it is usually given in combination with jalap and bitartrate of potash.—*Confectio Sulphuris*, D. (“Take of sublimed sulphur, two ounces; bitartrate of potash, one ounce; clarified honey, *by weight*, one ounce; syrup of ginger; syrup of saffron, of each, half a fluid ounce. Triturate all the ingredients in a mortar, until they are intimately mixed”). This preparation, long employed by practitioners, under the name of sulphur electuary, in the treatment of hemorrhoidal affections, has been introduced into the last Dublin Pharmacopœia. The dose of it is from ʒij. to ʒss.—*Sulphur precipitatum*, vel *Lac Sulphuris*, (*Precipitated Sulphur; milk of Sulphur*). This preparation, which was at one time very generally employed instead of sublimed sulphur, has nearly fallen into disuse, in consequence of the very impure state in which it is usually sold. It is prepared by boiling one part of sublimed sulphur and two parts of slaked lime in eight parts of water; filtering the solution and adding sufficient hydrochloric acid to precipitate all the sulphur, which is then dried on a stove. The dose is the same as that of sublimed sulphur, than which it was supposed to have a milder taste and smell. The most ordinary adulteration of this preparation is with sulphate of lime, of which it frequently contains from 40 to 50 per cent. Its presence may readily be detected by heating any quantity of the preparation on a metallic plate, when the whole of the sulphur will be sublimed and any sulphate of lime it may contain will be left behind.

TAMARINDUS, D. L. E. *Tamarinds; Pulp of the legumes (pods, D.) of Tamarindus Indica*. A native of the East Indies, from whence

it has been carried into Africa, where it now grows plentifully in Upper Egypt; it is also cultivated in the West Indian Islands, and in South America. It belongs to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Diadelphia Triandria*.

BOTANICAL CHARACTERS.—A beautiful tree, about thirty feet in height, branching superiorly; Leaves, abruptly pinnate, alternate; Flowers, in terminal, pendant racemes, of a lemon-yellow colour. Fruit, a legume, stalked, from three to four inches long, and nearly an inch broad, slightly compressed, 3-12 seeded; it is composed of a dry, brittle, brown shell, filled with a reddish acidulous pulp, in which are imbedded the smooth, quadrangular seeds.

PREPARATION.—The pulp of the fruit is freed from the husk, and with the contained seeds is packed in layers in barrels, and boiling syrup poured over it; the drier and dark-coloured East Indian tamarinds are said to be preserved without sugar, (*Pereira*).

PHYSICAL PROPERTIES.—Tamarinds, as imported, are of a reddish yellow colour (*West Indian*), or reddish-brown (*East Indian*), of the consistence of candied-honey, being composed of the pulp, the seeds, and numerous vegetable fibres; they have a slightly vinous odour, and a sweet very acid taste, somewhat astringent.

CHEMICAL PROPERTIES.—Tamarind pulp is composed of citric, tartaric, and malic acids, bitartrate of potash, sugar, vegetable jelly, and parenchyma. It yields its properties to water, affording an acid solution.

Adulterations.—Tamarinds, as imported, frequently contain an appreciable quantity of copper; sulphuric acid is also sometimes added to tamarinds which have not been well preserved or have been too long kept, to give them an acid taste. The contamination with copper may be detected by plunging a plate of polished iron, as a knife, into the tamarinds, when, should any copper be present, the iron will receive a coating of that metal. Sulphuric acid may be detected by a strained decoction giving a white precipitate, insoluble in nitric acid, with solution of chloride of barium or nitrate of baryta. In the French market tamarinds are often met with which contain large quantities of animal charcoal, its presence may be readily detected by agitating the fruit with cold water.

THERAPEUTICAL EFFECTS.—Tamarind pulp is refrigerant and mildly laxative, but although adapted for mild febrile or inflammatory affections occurring in children, it is seldom employed alone. Its combinations with senna have been before mentioned.

DOSE AND MODE OF ADMINISTRATION.— $\bar{3}$ ss. to $\bar{3}$ iss.—Tamarind whey is prepared by boiling $\bar{3}$ j. of tamarinds with Oj. of new milk, and straining; it is an excellent cooling, gently laxative drink in febrile diseases.

INCOMPATIBLES.—The salts of potash; alkaline carbonates; lime water; tartar emetic; and the acetates of lead.

TEREBINTHINÆ OLEUM. *Oil of turpentine* (described in the division *Anthelmintics*), given in large doses, acts as an active cathartic; when administered alone, however, its action is uncertain, and consequently it is usually prescribed in combination with castor oil; in this form it proves a most effectual purgative, in obstinate constipation, especially when dependant on affections of the brain; in spasmodic diseases, as in chorea, hysteria, epilepsy, and tetanus; in sciatica and other neuralgic affections; in passive hemorrhages; and in purpura hemorrhagica: in the latter disease, administered in large doses, it has proved very successful in my hands, (See *Dublin Journal of Medical Science*, Vol. xxviii., p. 189). The dose of oil of turpentine, as a cathartic, is from ℥ij. to ℥ij., either given by the mouth or in the form of enema. (See, *Epispastics* and *General Stimulants*.)

VIOLA, E. *Flowers of Viola odorata.* An indigenous plant; belonging to the Natural family *Violaceæ*, and to the Linnaean class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—An humble, perennial creeper; Leaves very numerous, cordate, nearly glabrous; Runners, flagelliform; Flowers, appearing in March and April, blue (after expansion turning deep purple), often white.

PREPARATION.—The Flowers are gathered as soon as they expand, and dried with a stove heat between folds of bibulous paper; their properties are best preserved in the form of the syrup of violets of the pharmacopœia.

PHYSICAL PROPERTIES.—"Violet flowers are so remarkable for their odour and colour, that they have given a name to both." (*Duncan*).

CHEMICAL PROPERTIES.—They are composed of odorous principle, blue colouring matter, sugar, gum, albumen, and some salts. Violets yield their active principles to water, but not to alcohol. The infusion is a delicate test for both acids and alkalies, and as such is much employed by chemists.

THERAPEUTICAL EFFECTS.—Violet flowers possess mildly laxative properties, and in the form of syrup are sometimes administered to new-born infants, and to young children.

DOSE AND MODE OF ADMINISTRATION.—*Syrupus Violæ*, E. (Fresh violets, ℔j.; boiling water, Oiss.; pure sugar, ℔viiss.; infuse the flowers for 24 hours in a covered-glass or earthen-ware vessel; strain without squeezing, and dissolve the sugar in the filtered liquor). Dose, ℥j. to ℥iv.—*Mel Violæ*. (Fresh violet flowers, one part; honey, five parts). A mild laxative readily taken by children; Dose, ʒj. to ʒss.

CHAPTER VI.

CAUSTICS.

(Escharotics.—Cauterants.—Catheretics).

CAUSTICS are substances which, applied to the human body, disorganise and destroy the parts with which they come in contact. They are usually grouped into two classes:—*Escharotics*, which completely destroy the life of the part to which they are applied affecting also the deeper seated tissues to a greater or less degree, according to the energy of the substance and the quantity of it that may be applied, and producing an *eschar*, whence their name; and *Catheretics*, which are milder in their operation, acting more superficially and not effecting complete destruction of the parts to which they are applied. The action of caustics is chemical, as they destroy the life of the part, either by combining with the animal matter, so as to form a new compound with it, or by causing the elements of the animal tissues to enter into new combinations, by which their cohesion is subverted and their composition changed. The effects produced by caustics are more or less rapid, according to the properties of the substance that is used; if it be very powerful the change of structure effected is so immediate, that surrounding inflammation takes place only after the death of the part; while on the contrary, inflammation is the direct consequence of the less energetic caustics. The action of this class of remedies is generally local, but some of them (as arsenious acid), may become absorbed, and thus produce constitutional symptoms. The various purposes for which caustics are employed will be treated of when considering the individual remedies of the class.

ACIDUM ACETICUM GLACIALE, D. ACIDUM ACETICUM, E.—*Acetic acid. Glacial acetic acid.*

ACIDUM ACETICUM E LIGNO VENALE, D. ACIDUM PYROLIGNEUM, E. *Acetic acid of commerce; Purified pyroligneous acid; specific gravity, 1.044, D.—Diluted acetic acid, obtained by the destructive distillation of wood, E.*

ACIDUM ACETICUM FORTE, D. ACIDUM ACETICUM, L.—*Acetic acid slightly diluted.*

PREPARATION.—ACIDUM ACETICUM GLACIALE, D.—“Take of acetate of lead, any

convenient quantity. Place it in an oven, at about the temperature of 300° , until it ceases to lose weight, and, having then brought it by trituration to a fine powder, let it be introduced into a flask or retort, and exposed to an atmosphere of dry muriatic acid gas, until very nearly the whole of it exhibits a damped appearance. The flask or retort being now connected in the usual manner with a Liebig's condenser, let heat be applied by means of a chloride of zinc bath, until the entire of the acetic acid shall have distilled over. The muriatic acid gas should be *slowly* disengaged from the materials directed in the formula for *Acidum Muriaticum*, using eight ounces of salt for every pound of anhydrous acetate of lead; and, to render it quite dry, it should, before being conducted into the vessel containing the sugar of lead, be made to bubble through oil of vitriol, and then pass through a long tube packed with small fragments of fused chloride of calcium. The specific gravity of this acid is 1065."—*ACIDUM ACETICUM FORTE*, D.—"Take of glacial acetic acid, six fluid ounces; distilled water, four ounces. Mix. The specific gravity of this acid is 1066."—*ACIDUM ACETICUM*, L.—"Acetate of soda, ℥ij.; sulphuric acid, ℥ix.; water, f℥ix.; add the sulphuric acid, first mixed with the water, to the acetate of soda put into a glass retort, then let the acid distil from a sand bath; care is to be taken that the heat be not too great towards the end."—*ACIDUM ACETICUM*, E.—"Take of acetate of lead any convenient quantity, heat it gradually in a porcelain basin by means of a bath of oil or fusible metal (8 tin, 4 lead, 3 bismuth), to 320° , F.; and stir till the fused mass concretes again; pulverise this when cold, and heat the powder again to 320° , with frequent stirring, till the particles cease to accrete, add ℥vj. of the powder, to f℥ixss. of pure sulphuric acid contained in a glass matrass; attach a proper tube and refrigerator, and distil from a fusible metal bath with a heat of 320° , to complete dryness. Agitate the distilled liquid with a few grains of red oxide of lead to remove a little sulphurous acid, allow the vessel to rest for a few minutes, pour off the clear liquid and redistil it." Pyroligneous acid is an article of the *Materia Medica* in the Dublin and Edinburgh Pharmacopœias.

PHYSICAL PROPERTIES.—The acetic acid of commerce which is officinal in the Dublin and Edinburgh Pharmacopœias, is prepared by manufacturers of pyroligneous acid, and is usually sufficiently pure and concentrated for most medical purposes. Glacial acetic acid, as prepared by the processes given above, is used for the purpose of preparing the strong acid of the Dublin College. The Edinburgh College uses it undiluted. Acetic acid is a limpid colourless liquid, with a very pungent refreshing smell, and a caustic, highly acid taste. The specific gravity of the London preparation, which is weaker than any of those of the other colleges, is 1.048; it contains 30.8 per cent. of real acid. The specific gravity of the pyroligneous acid of the Edinburgh College is stated to be *at least* 1.034.

CHEMICAL PROPERTIES.—Acetic acid, *Glacial acetic acid*, consists of one equivalent of anhydrous acetic acid ($C^4 H^3 O^3$), and one of water; it crystallizes at 60° , and is vaporizable at 248° F.; when of the density 1.063, one hundred minims (97 grains), neutralize nearly 242 grains of crystallized carbonate of soda. Pyroligneous acid (*Dublin*), contains, according to Mohr's table, 33 per cent. of hydrated acetic acid, while that of the Edinburgh College contains but 25 per cent. Acetic acid (*London*), consists of one equivalent of anhydrous acid, and thirteen of water; 100 grains neutralize 87 grains of crystallized carbonate of soda. Acetic acid reddens litmus paper, and its vapour fumes with ammonia; it combines with many of the metallic oxides forming crystallizable salts; it dissolves the

vegetable alkaloids, camphor, resins, fibrine, albumen, and also the active principles of many vegetable medicines, in consequence of which properties it is much employed in pharmacy.

Adulterations.—It should be of the prescribed density; if lighter it probably does not contain sufficient of the anhydrous acid, but as before remarked with respect to vinegar, this test is not to be depended on; the strength can be more accurately ascertained by its neutralizing power over carbonate of soda. It is sometimes adulterated with sulphuric or hydrochloric acid; the former may be detected by the production of a white precipitate insoluble in nitric acid on the addition of a solution of chloride of barium or nitrate of baryta; the latter by a similar precipitate being produced on the addition of a solution of nitrate of silver. The occasional impregnation with lead or copper is readily detected by sulphuretted hydrogen causing a black precipitate.

USES.—Acetic acid undiluted acts quickly and powerfully on the skin, causing redness and vesication, and destroying the life of the part if left sufficiently long applied. It may, therefore, be used as a ready means of producing vesication; but its chief use is as a caustic to destroy corns and warts, the latter especially, when of a syphilitic origin.

ACIDUM MURIATICUM VENALE, D. ACIDUM MURIATICUM, E.—*Commercial Muriatic Acid; Hydrochloric Acid of Commerce.*

ACIDUM MURIATICUM PURUM, D. E. ACIDUM HYDROCHLORICUM, L.—*Pure Muriatic acid; Hydrochloric acid.*

PREPARATION.—*Dublin.*—“Take of dried chloride of sodium, three pounds; oil of vitriol of commerce, forty-four fluid ounces; water, thirty-two ounces; distilled water, forty-four ounces: dilute the oil of vitriol with the thirty-two ounces of water, and when the mixture has cooled, pour it upon the salt, previously introduced into a globular flask having a capacity of at least one gallon. A gentle heat being now applied, let the muriatic acid gas, as it escapes, be conducted into a bottle containing the distilled water, by means of a bent tube dipping about half an inch beneath its surface, and let the process be continued until the product measures three pints. Throughout this operation, particularly towards its close, the temperature of the water which absorbs the gas must, by the application of external cold, be prevented from rising. The specific gravity of this acid is 1176.” *London.*—“Chloride of sodium, dried, lbij.; sulphuric acid, ℥xx.; distilled water, ℥xxxiv.; add the sulphuric acid, first mixed with ℥xxij. of the water, to the chloride of sodium put into a glass retort, pour what remains of the water into a receiver, and, the retort being fitted to it, let the acid, distilled from a sand bath, pass over into this water, the heat being gradually increased.” *Edinburgh.*—“Purify muriate of soda by dissolving it in boiling water, concentrating the solution, skimming off the crystals as they form on the surface, draining from the adhering solution, and washing the crystals slightly with cold water; take of this salt previously well dried, of pure sulphuric acid, and of water, equal weights; put the salt into a glass retort, and add the acid previously diluted with a third part of the water, and allow to cool; fit on a receiver which contains the rest of the water, distil with a gentle heat by means of a sand bath, or a naked coal-gas flame, so long as any liquid passes over, preserving the receiver cool by snow or a stream of cold water.”

PHYSICAL PROPERTIES.—A limpid colourless liquid, with a yellowish tinge when not quite pure, having a suffocating odour, and an intensely acid, disagreeable taste. The specific gravity of the liquid acid of the Dublin Pharmacopœia is, 1·176, that of London, 1·160, and that of Edinburgh, 1·170.

CHEMICAL PROPERTIES.—It is a solution of hydrochloric acid gas (HCl.) in water; the Dublin preparation contains about 36 per cent. of real acid, the London about 32, and the Edinburgh about 34 per cent. Exposed to the air, hydrochloric acid emits suffocating fumes which become white in contact with the vapour of ammonia; it possesses the usual characteristics of a strong acid.

Adulterations.—It should be of the prescribed density, that being a perfect test of its strength; it is frequently contaminated with iron and with chlorine, to the presence of either or both of which is due the yellow colour of the impure acid; the former may be detected by solution of ferrocyanide of potassium producing a blue precipitate with the neutralized acid; the latter by the acid dissolving leaf gold. The presence of sulphuric acid, an occasional impurity, is indicated by the solution of nitrate of baryta or chloride of barium occasioning a white precipitate in the acid previously diluted.

USES.—As a caustic, hydrochloric acid has been used with much success to destroy the false membranes which are formed in diphtheritis, to check the spreading of the mortification in cancrum oris, and as an application to obstinate ulcers of the tongue and in phagedenic ulceration of the tonsils. It has also been employed as an external application in hospital gangrene. It may be applied by means of a piece of sponge attached to a bit of whalebone.

In cases of poisoning with this acid, the antidotes are chalk, and magnesia or its carbonate, combined with demulcent and emollient drinks.

ACIDUM NITRICUM VENALE, D. ACIDUM NITRICUM, E.—*Commercial Nitric Acid.*

ACIDUM NITRICUM PURUM, D. E. ACIDUM NITRICUM, L.—*Pure Nitric Acid.*

PREPARATION.—*Dublin.*—"Take of nitrate of potash, two pounds; nitrate of silver, two drachms, or as much as may be necessary; boiling distilled water, five pints; oil of vitriol of commerce, seventeen fluid ounces: dissolve the nitrate of silver in two ounces, and the nitrate of potash in the remainder of the water, and add by degrees the former solution to the latter, until a precipitate ceases to form. Pass now through a calico filter, and, having evaporated to perfect dryness the clear liquor thus obtained, introduce the residuum into a retort, whose neck is made to pass at least five inches into the glass tube of a Liebig's condenser; then pour upon it the oil of vitriol, and with a heat which, towards the close of the process, must be raised so as to liquefy the contents of the retort, cause the nitric acid to distil over. The specific gravity of this acid is 1500." *London.*—"Nitrate of potash, dried; and sulphuric acid, of each, ℥ij.; mix in a glass retort, then let the acid distil in a sand bath." *Edinburgh.*—"Purify nitrate of potash, if necessary, by two or more crystallizations, till nitrate of silver does not precipitate its solution in distilled water; put into a glass retort equal

weights of this purified salt and of sulphuric acid, distil into a cooled receiver with a moderate heat from a sand bath or naked gas-flame, so long as the fused material gives off vapour; the pale yellow acid thus obtained, may be rendered colourless, should this be desired, by heating it gently in a retort."

PHYSICAL PROPERTIES.—A dense colourless liquid, (when not quite pure having an orange hue), with a powerful, disagreeable odour, and an intensely acid, caustic taste. The specific gravity of the officinal acid in the three pharmacopœias is 1.500.

CHEMICAL PROPERTIES.—It is composed of anhydrous nitric acid (NO^5), and water; the pure acid of the pharmacopœias contains about 80 per cent. of real acid. Nitric acid emits white fumes in the air, which become much denser when mixed with the vapour of ammonia. It stains the cuticle yellow, and destroys whatever animal tissues it comes in contact with; it possesses the usual characteristics of a strong acid. The best test for distinguishing nitric acid from the other mineral acids, is its action on morphia or its salts, which it immediately turns deep orange.

Any slight adulterations which are met with in nitric acid are unimportant with reference to its medicinal use. The density is the best characteristic of its strength.

USES.—As a caustic, strong nitric acid is employed to destroy corns and warts, as an application to parts bitten by rabid animals, to poisoned wounds, and to phagedenic ulcers; more recently its application to certain forms of hemorrhoids has been very favourably mentioned by the late Dr. Houston of this city, (See *Dublin Journal of Medical Science*, 1st series, vol. xxiii. p. 102.) In its application for any of the above purposes, the neighbouring parts should be smeared with olive oil or some resinous ointment so as to confine the action of the acid. M. Rivallié has recently prepared what he terms *solidified nitric acid* as a substitute for the ordinary nitric acid as a caustic. He prepares it as follows:—Some lint is placed in an earthen vessel, and a certain quantity of nitric acid in its highest degree of concentration is gradually dropped upon it; a gelatinous paste is the result, and to this a shape in keeping with the tissues to be cauterized, is to be given. It is applied by means of a long (wooden) forceps, and left on according to the desired effect, from 15 to 20 minutes; in cases, however, where the surgeon wishes to destroy a large surface, as for example, in encephaloid cancer, it may be left on for 24 hours. The advantages which M. Rivallié states this caustic to possess, are, that it is not so painful as liquid nitric acid, and that its action is limited to the part to which it is applied, and does not spread to the neighbouring tissues.

In cases of poisoning with this acid, the antidotes are the same as for hydrochloric acid.

ACIDUM SULPHURICUM. *Sulphuric acid* (described in the division *Astringents*), possesses powerfully caustic properties, destroying

the animal tissues wherever it is brought in contact with them. It is used as a caustic to the integument of the eyelid in *entropium* or inversion of the lid, and to the conjunctiva reflected on the eyelid in *ectropium* or eversion of the lid. It is also employed to destroy warts, and as an application to poisoned wounds. M. Velpeau speaks most highly of a caustic paste prepared by mixing 2 parts of concentrated sulphuric acid with 1 part of saffron. He uses it chiefly as an application to cancerous and other malignant ulcerations.

AMMONIÆ LIQUOR FORTIOR, D. L. AMMONIÆ AQUA FORTIOR, E.—*Concentrated aqueous solution of ammonia; Strong ammonia.*—This preparation resembles in its physical properties that already described in the division *Antacids*; in its chemical properties it only differs in containing more ammonia, its density being 900, D., 882 at 62°, L., and 880, E. In the London Pharmacopœia it is an article of the *Materia Medica*; in the Edinburgh, the same process is followed for both solutions. The two following processes for its preparation are given by the Dublin College:—

PREPARATION.—*Dublin.*—“Apply heat to a mixture of sal ammoniac and slaked lime, using the proportions given in the preceding formula, [that for ammoniæ liquor] and cause the gas, as it is disengaged, to pass to the bottom of a bottle containing eight ounces of *Ammoniæ Liquor*; the temperature of the latter being prevented from rising by surrounding it with cold water, which should be frequently renewed. *Or*, Pass the ammoniacal gas disengaged from eight ounces of sal ammoniac into five ounces of distilled water, taking care to keep the receiver cool. The specific gravity of this solution is 900.”

USES.—It has been only used as a caustic, applied locally, in the bites of rabid animals. (See *Epispastics*).

ANTIMONII TERCHLORIDI LIQUOR, D.—*Solution of terchloride of Antimony; Butter of Antimony.*

PREPARATION.—“Take of prepared sulphuret of antimony, one pound; muriatic acid of commerce, four pints. Upon the sulphuret, placed in a porcelain capsule, pour the acid, and, constantly stirring it, apply to the mixture, beneath a flue with a good draught, a gentle heat, which must be gradually augmented as the development of the gas begins to slacken, and finally carried to ebullition, and maintained at this temperature for fifteen minutes. The vessel being now removed from the fire, let its liquid contents be separated by filtration through calico, returning what passes through first, in order that a perfectly clear solution may be obtained. Transfer the liquid to another capsule, and, having boiled it down to the bulk of one quart, allow it to cool, and preserve it in a bottle furnished with a well-ground glass stopper. The specific gravity of this solution is 1470.”

PHYSICAL PROPERTIES.—A transparent liquid of a wine yellow colour, with the odour of hydrochloric acid, and a strongly acid caustic taste. The commercial article is of a deep reddish-yellow colour in consequence of its containing a little nitrous acid and hydrochlorate of iron.

CHEMICAL PROPERTIES.—The preparation of the Dublin Pharmacopœia is a solution of terchloride of antimony in water. It emits white fumes in the air; left exposed, it evaporates spontaneously, leaving as a residuum a white semi-crystalline mass; mixed with water it throws down a yellowish-white powder, formerly called *Powder of Algaroth*, (oxychloride of antimony). This solution has a powerfully acid reaction.

USES.—It is employed as a caustic to parts bitten by rabid animals, its liquidity enabling it to penetrate into all parts of the wound; the wound should be first dried as well as possible with pieces of lint, as all liquids immediately decompose this preparation. Pure muriate of antimony has been used as an application to staphyloma by some German surgeons; a camel's-hair-pencil or a point of lint is dipped in the deliquescent salt and applied to the tumour until a whitish crust is perceived, when the whole is washed away by means of a large camel's-hair-pencil dipped first into milk and afterwards into milk and water.

In cases of poisoning with this solution the same treatment should be employed as in poisoning with hydrochloric acid.

ARGENTI NITRAS, L. E. ARGENTI NITRAS FUSUM, D.—*Nitrate of Silver; Lunar Caustic.*

PREPARATION.—"Take of refined silver, three ounces; pure nitric acid, two fluid ounces; distilled water, five ounces. Place the silver in a flask, and, having poured upon it the acid and water, apply a gentle heat until the metal is dissolved. Transfer the solution to a porcelain capsule, decanting it off a heavy black powder which appears at the bottom of the flask, and, having evaporated it to dryness, raise the heat (in a dark room) until liquefaction is produced. Pour the melted nitrate of silver into a brass mould furnished with cylindric cavities of the size of a goose quill, and which admits of being opened by a hinge, and, when the salt has concentered, remove it, and preserve it in well-stopped bottles rendered impervious to light," D.—"Take of pure silver, ʒiiss.; pure nitric acid, fʒj.; distilled water, fʒij.; dissolve the silver in the diluted acid in a sandbath (with the aid of a moderate heat, E.), and evaporate gradually to dryness; liquefy this in a crucible with a slow fire, and pour into proper moulds (into iron moulds previously heated and greased slightly with tallow; preserve in glass vessels, E.," L. E.

PHYSICAL PROPERTIES.—A solid salt in the form of rods or pencils, smooth and polished on the surface, of the thickness of a writing pen. They have a crystalline fracture, and are of a grayish slate colour, inodorous, with a bitter caustic and metallic taste.

CHEMICAL PROPERTIES.—Nitrate of silver is composed of one equivalent of nitric acid, and one of oxide of silver, (AgO , NO^5). It is not deliquescent; it is soluble in its own weight of water at 60° , and in four parts of rectified spirit; heated it fuses, and by a red heat is decomposed and metallic silver is obtained. Exposed to light in contact with the smallest trace of organic matter, it becomes brown or blackish. It stains the cuticle black. The best test for nitrate of silver in solution is the addition of any of the soluble chlorides, (as chloride of sodium), a white curdy precipitate

is formed which becomes black by exposure to strong light, and is soluble in ammonia, but not in either cold or boiling nitric acid.

Adulterations.—Nitrate of silver, as met with in commerce, is frequently adulterated with nitrates of potash, lead, zinc, and copper, and with black oxide of manganese. The latter is detected by dissolving the salt in water, when it is left in the form of a black powder; the nitrates of lead, zinc, and copper are detected by precipitating a solution of the salt with excess of solution of chloride of sodium; the precipitate is not entirely soluble in ammonia if lead be present, and the liquid part gives with sulphuretted-hydrogen a white precipitate if any zinc was present, but a black one if the impurity was copper. Nitre is detected by precipitating the silver with hydrochloric acid, filtering and evaporating, when if any be present it will be obtained in the crystalline state.

USES.—As a caustic, nitrate of silver possesses many advantages over the other remedies of this class, and consequently is much more frequently employed; applied to the skin or to the mucous membranes, it produces a whitish stain which rapidly becomes greyish, and if exposed to light, finally black; and at the same time the part to which it is applied is deprived of vitality. Its chief value as a caustic depends on its great manageableness in consequence of its solid form, on its property of not deliquescing, and on its mild but effectual action, the pain produced by it, although sometimes acute, being but of short duration. Its uses are very numerous: it is employed to destroy warts, corns, and many small tumours; to check hemorrhage occurring from small vessels, as in the bleeding from leech-bites in children; to repress exuberant granulations; applied to the sound skin above the inflamed part, to stop the spread of erysipelas and erythema, to effect which it must be applied freely so as to destroy the rete-mucosum as well as the cuticle. In the first stage of chancre, when the ulcer is very minute, nitrate of silver applied freely generally checks the disease and prevents it from spreading further; indeed in all sores about the prepuce or glans, whether of syphilitic origin or not, its application is for the most part beneficial. In large indolent ulcers applied over the whole surface, it acts with excellent effect, in many instances as soon as the eschar which it produces peels off, the sore is found to be healed. A strong solution, from $\frac{3}{4}$ ij. to $\frac{3}{4}$ j. in an ounce of distilled water is the best application in relaxation with enlargement of the uvula and tonsils, and in follicular inflammation of the mucous membrane of the pharynx and larynx. When the disease affects the lining membrane of the larynx, it has been proposed by Dr. Horace Green, of New York, to introduce the solution within the rima glottidis, and thus apply it directly to the mucous membrane of the organ; and this practice is now very generally adopted with most excellent effect: the operation is easily effected by means of a piece of sponge attached to a curved whalebone rod. The same treatment has been more recently proposed for croup in its acute stage. As a topical application in the solid state or in the

form of a strong solution, it is most valuable in ulcerations of the cornea, and in purulent and gonorrhœal ophthalmia; a weaker solution (gr. ij. to gr. v. to f̄j. of water) may be employed in both acute and chronic conjunctivitis; it is, however, liable to produce specks on the cornea or dark stains on the conjunctiva, as first observed by Professor Jacob of this city. Nitrate of silver has been also used in the solid state to remove strictures of the urethra and œsophagus, applied by means of a bougie into the point of which it is inserted (*armed or caustic bougie*), but the practice is dangerous. In gonorrhœa occurring in females, a pencil of nitrate of silver is applied freely to the mucous membrane of the vagina, it is said with much benefit, and in the same disease in males an injection varying in strength from gr. ij. to gr. xx. dissolved in f̄j. of water is injected into the urethra; such treatment, however, is not unattended with danger. Nitrate of silver is also employed with benefit, as a topical application in many forms of ulcerations of the gums, the tongue, and the fauces; in excoriations of the nipples, in the chronic stages of eczema, impetigo, and other diseases of the skin; and in the acute stage of herpes preputialis, and herpes labialis. (See *Tonics*).

ACIDUM ARSENIOSUM PURUM, D. ACIDUM ARSENIOSUM, L. ARSENICUM ALBUM, E.—ARSENICI OXYDUM ALBUM VENALE, D.—*White oxide of Arsenicum; Pure Arsenious acid; Arsenic; White oxide of Arsenic of Commerce.*

PREPARATION.—Arsenious acid is an article of the *Materia Medica*; it is prepared by roasting metallic ores in which the metal is contained, especially the arseniuret of cobalt, in a reverberatory furnace to which is attached a long chimney in a horizontal direction; it is deposited on the floor of the chimney in the form of a grey powder which is refined by sublimation. The Dublin College directs a re-sublimation, for medical purposes, *Acidum Arseniosum purum*, which, however, is not required in consequence of the good quality of what is met with in commerce in the present day; the process is as follows:—"Take of commercial white oxide of arsenic, any convenient quantity; place it in a Florence flask, the neck of which is made to pass into that of a second flask of larger size, and applying to the *former* a regulated heat, by suspending it beneath a semi-cylindric hood of sheet iron, a few inches above a small charcoal fire, cause the arsenic to sublime into the *latter*. This sublimation should be conducted under a flue with a good draught, so as to protect the operator from inhaling any vapours which may escape being condensed."

PHYSICAL PROPERTIES.—In large, vitreous cakes or masses, whitish, sometimes having a yellow tinge; transparent, but on exposure to the air soon becoming opaque like enamel, the opacity gradually extending to the centre of the masses; the cakes are moderately hard and brittle. Arsenic is inodorous; it is also nearly tasteless, but when the tongue is kept for a few moments in contact with a piece of arsenic, a slightly bitter and acrid taste afterwards becoming sweetish may be perceived. Its specific gravity, when transparent, is 3.738, and when opaque, 3.699.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of the

metal arsenic, and three equivalents of oxygen, (As O^3). Exposed to a heat of 380°F. , it sublimes unchanged, and as it cools condenses into small transparent crystals of adamantine lustre, which are regular octohedrons. At ordinary temperatures, water dissolves from an 800th to a 400th of its weight of powdered arsenious acid; boiling water dissolves nearly a ninth of its weight, and on cooling to 60° , retains a 35th, (Christison). The solution reddens litmus paper slightly. The chemical characteristics of arsenious acid are as follows:—thrown on red hot charcoal or cinders it evolves a scarcely visible vapour, *metallic arsenic*, which has a strong alliaceous odour, and which at the distance of a few inches from the charcoal is converted into a dense white odourless smoke, *arsenious acid*; heated with carbonaceous matter in a glass tube, it is reduced and the metal sublimed, forming a greyish-black ring in a cooler part of the tube, and which by the application of heat to the outside of the glass, is resublimed in the form of arsenious acid; its solution precipitates lemon-yellow with ammoniacal nitrate of silver, grass-green with ammoniacal sulphate of copper, and sulphur-yellow with sulphuretted hydrogen; put into a proper apparatus, as Marsh's test tube, or a Döbereiner's lamp, with zinc and sulphuric acid, arseniuretted hydrogen will be evolved, which, being ignited as it passes through the fine aperture of the exit tube, deposits metallic arsenic on a plate of glass or porcelain held in the flame, and arsenious acid if held a little above the flame: and, finally, if an aqueous solution of arsenious acid be boiled with pure hydrochloric acid, and clean copper foil, or fine copper gauze, or copper wire, the latter acquires an iron-grey coating of metallic arsenic, (*Reinsch's test*).

Adulterations.—Arsenious acid seldom contains any impurity; as sold in the form of powder, it is sometimes adulterated with chalk or sulphate of lime, or it may accidentally contain a little oxide of iron; any of them may be detected by the application of heat, which sublimes the acid and leaves the impurity.

USES.—Arsenious acid is a powerful caustic, producing death of the part to which it is applied, which subsequently separates by sloughing; in consequence, however, of the danger which may occur from its absorption, it is but seldom employed in regular practice in the present day. The cases in which it has been found of use are, malignant or cancerous ulcerations especially of the skin of the face, in lupus, in onychia maligna, and in hospital gangrene. It may be applied in the form of ointment made with axunge or spermaceti, powdered opium being added to allay the pain it causes. Dangerous symptoms are less likely to arise from its absorption, if an ointment containing a tenth or a sixth of its weight of the acid be employed, than if a weaker preparation be used.—*Arsenical paste*, CAZENAVE. (Arsenic, 2 parts; sulphate of mercury, 1 part; animal charcoal, 2 parts; mix). When required for use, a few drops of water are added to this powder so as to form it into a thin paste, which is spread upon the surface to be acted on, which should

never exceed an inch in diameter at each application.—*Arsenical caustic powder*, (Arsenic, 8 parts; dragon's blood; and cinnabar, of each, 15 parts; mix and reduce to a fine powder). This powder is made into a paste with a little saliva or gum-water just before it is applied. (See, *Tonics*).

CUPRI SUBACETAS, D. ÆRUGO, D. L. E.—*Subacetate of Copper; Verdigris; Impure diacetate of Copper.*

PREPARATION.—An article of the *Materia Medica*, obtained by placing plates of copper in contact with the fermenting marc of the grape, or with cloths dipt in vinegar. The Dublin College directs this article to be prepared for medical use, *Cupri subacetis præparatum*, by the following process:—"Take of subacetate of copper, a convenient quantity: reduce it to powder by careful trituration in a porcelain mortar, and separate the finer parts for use by means of a sieve."

PHYSICAL PROPERTIES.—In coarse masses or in powder, either of a beautiful pale bluish-green colour (*green verdigris*), or of a rich blue (*blue verdigris*) with a disagreeable acetous odour, and a styptic, metallic taste.

CHEMICAL PROPERTIES.—*Blue verdigris* is the hydrated diacetate of copper, and *green verdigris* consists of the subsesquiacetate and the trisacetate, (Berzelius). It is permanent in the air; heated it first loses water, then acetic acid, and the residue contains metallic copper; water resolves it into a soluble acetate, and an insoluble trisacetate. It is dissolved entirely by both sulphuric and hydrochloric acids.

Adulterations.—The slight impurities, metallic copper or earthy matters, present in commercial verdigris are of no importance; they may be detected by its solubility in sulphuric or hydrochloric acid.

USES.—As a caustic it is applied to indolent ulcers, to venereal warts, and to fungous growths; it is also a useful application in ophthalmia tarsi; and in chronic diseases of the scalp, when they are of an indolent and obstinate character. It may be used in powder, or in either of the following forms:—*Unguentum cupri subacetatis*, D. *Unguentum æruginis*, E. (Subacetate of copper, in fine powder (prepared, D.), ʒss. (ʒj., E.); ointment of white wax, ʒvijs. (ointment of white resin, ʒxv., E.); "triturate the subacetate of copper with the ointment until they are intimately mixed," D.; "melt the ointment and add the verdigris," E.).—*Linimentum æruginis*, L. (Verdigris, in powder, ʒj.; vinegar, fʒviij.; honey (despumated), ʒxiv.; dissolve the verdigris in the vinegar, strain through a linen cloth; add the honey, and boil to a proper consistence). A mild caustic, applied to venereal ulcers of the mouth and tonsils, and to the ulcerated sore throat of scarlatina.

In cases of poisoning with verdigris, the best antidote is albumen.

CUPRI CARBONAS.—*Carbonate of Copper*. This preparation, ob-

tained by precipitating a solution of sulphate of copper with carbonate of soda, though not contained in any of the British pharmacopœias deserves a short notice, in consequence of the success obtained from its use in the chronic forms of impetigo and eczema of the scalp, by M. Devergie in the *hôpital Saint Louis* at Paris; he employs it in the form of ointment, prepared by mixing intimately ʒij. of the powder with ʒj. of axunge.

CUPRI SULPHAS. *Sulphate of Copper* (described in the division *Astringents*) is used in the solid state as a caustic, to repress excessive granulations, to destroy venereal warts, and to excite a new action in indolent ill-conditioned ulcers; it is also applied with much benefit to chancres in their early stage.

HYDRARGYRI OXYDUM RUBRUM, D. E. HYDRARGYRI NITRICO-OXYDUM, L. *Nitric oxide of mercury; Red oxide of mercury; Red precipitate.*

PREPARATION.—*Dublin.* “Take of pure mercury, eight ounces; pure nitric acid, three fluid ounces; distilled water, six ounces: in the acid, diluted with the water, digest the mercury, using at first a very gentle heat, but, when the action has ceased, finally boiling for a few minutes; and, having decanted the solution, evaporate to dryness. Let the residuum, first reduced to powder, be transferred to a shallow cast-iron pot with a flat bottom, and loosely covered by a fire-tile lid; and in this let it be exposed to the heat of a slow fire until red vapours cease to be given off. The heat must now be withdrawn, and, when the pot has cooled, its contents should be transferred to bottles.” *London.*—“Mercury, ℥iij.; nitric acid, ℥iiss.; distilled water, Oij.; mix in a proper vessel, and with a gentle heat dissolve the mercury; boil away the liquor, and pulverize the residuum; put this into a shallow vessel, and apply a gentle heat, gradually increasing until red vapour ceases to arise.” *Edinburgh.*—“Mercury, ʒviiij.; dilute nitric acid (D. 1280), fʒv.; dissolve half the mercury in the acid with the aid of a gentle heat, and continue the heat until a dry white salt be left; triturate the rest of the mercury with the salt till a fine uniform powder be obtained; heat the powder in a porcelain vessel, and constantly stir it, till acid fumes cease to be disengaged.”

PHYSICAL PROPERTIES.—In brilliant, micaceous masses, varying in colour from orange-yellow to bright scarlet; inodorous, with a taste at first faintly, then strongly, caustic and metallic. Specific gravity, 11·074. In fine powder its colour is yellow.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of mercury, and 1 of oxygen, generally containing a little undecomposed nitrate of mercury; exposed to a red heat, the oxide of mercury is entirely volatilized in the form of oxygen and metallic mercury. It is very sparingly soluble in water, boiling water dissolving about a 7000th of its weight. It is very soluble in hydrochloric, acetic, and hydrocyanic acids; but is insoluble in alcohol.

Adulterations.—The nitric-oxide of mercury sometimes contains nitric acid, which is looked upon by the London and Edinburgh

Colleges as an impurity; its presence is indicated by the ruddy fumes evolved when the salt is heated; it is often adulterated with red-oxide of iron, red oxide of lead, or brick dust; they may be all detected by exposing the salt to a red heat, if pure it is entirely sublimed.

THERAPEUTICAL EFFECTS.—As a mild caustic, this preparation is applied to indolent ulcers, to spongy granulations, to venereal warts, to the eyelids in chronic inflammation of their edges, &c. It may be used in powder, or in ointment as follows:—*Unguentum hydrargyri oxydi rubri*, D.—*Nitrico-oxydi*, L. (“Take of red oxide of mercury, one drachm; ointment of white wax, seven drachms: reduce the oxide to a very fine powder, and mix it intimately with the ointment by trituration,” D.—“Nitric-oxide of mercury, 3j.; white wax, 3ij.; prepared lard, 3vj.; add the oxide in very fine powder to the wax and the lard melted together, and mix intimately,” L.).—*Unguentum oxydi hydrargyri*, E. (Red-oxide of mercury, 3j.; axunge, 3viij.; triturate them into a uniform mass).

HYDRARGYRI PERNITRATIS LIQUOR, D. *Solution of the pernitrate of mercury; Acid nitrate of mercury.*

PREPARATION.—“Take of pure mercury, two ounces; pure nitric acid, one fluid ounce and a half; distilled water, one ounce and a half: in the acid, first diluted with the water, dissolve the mercury, with the application of heat, and evaporate the solution to the bulk of two ounces and a half.”

A dense caustic solution very much employed at present, especially on the continent, to destroy malignant ulcerations, particularly when of a cancerous nature; and as a caustic application to lupus, and to ulcers of the cervix uteri. It is best applied by means of a brush or a piece of lint fastened to a stick. It has been known, when thus locally applied, to cause salivation; in one instance Breschet witnessed, salivation was produced by a single application to the ulcerated neck of the womb.

POTASSA CAUSTICA, D. **POTASSÆ HYDRAS**, L. **POTASSA**, E. *Caustic Potash; Hydrate of Potash; Potash.*

PREPARATION.—*Dublin.*—Take of solution of caustic potash, any convenient quantity: boil it in a silver or bright iron vessel, until its water has been evaporated away, and then raise the temperature until ebullition ceases, and a liquid is obtained which flows like oil. Pour this out upon a silver or iron dish, and, the moment it has set, break it into fragments, and enclose these in a green-glass bottle furnished with an air-tight stopper.” *London.*—“Take of solution of potash, cong. j.; evaporate the water in a clean iron vessel over the fire, until the ebullition being finished the hydrate of potash liquifies. Pour this into proper moulds.” *Edinburgh.*—“Take any convenient quantity of Aqua Potassæ, evaporate it in a clean and covered iron vessel, increasing gradually the heat, till there remains an oily looking fluid, a drop of which when removed on a glass-rod becomes hard on cooling; then pour out the liquid on a bright iron plate, and as soon as it solidifies, break it quickly and put into glass bottles secured with glass stoppers.”

PHYSICAL PROPERTIES.—In flat irregular pieces, or more generally in pencils or sticks of various lengths and about the thickness of a writing pen; grayish or bluish; inodorous; having a very acrid alkaline taste. Specific gravity, 1·8.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of potassium, 1 of oxygen, and 1 of water, ($\text{KO} + \text{HO}$); exposed to the air it deliquesces rapidly, soon becoming liquid, and attracting carbonic acid at the same time is converted into the carbonate. It is soluble both in water and alcohol, water dissolving nearly an equal weight of it; during its solution heat is evolved. It possesses the properties of an alkali in an eminent degree.

Adulterations.—It generally contains various impurities, such as oxide of iron, silica, and sulphates and carbonates of potash; their presence, however, is of little consequence with reference to its medical uses. The iron and silica may be detected by dissolving in water or in alcohol; the sulphates and carbonates by the appropriate tests for sulphuric and carbonic acids.

USES.—Caustic potash is a powerful caustic, but so unmanageable in consequence of its deliquescent property, that it is not often employed. Its chief use is for making an issue, which is effected by covering the part with two or three layers of adhesive plaster, in the centre of which an aperture is cut of the size of the intended issue; the caustic potash is rubbed on the part until the surface is destroyed; a linseed meal poultice is then applied, and when the slough separates a pea is inserted. For producing issues, however, the following preparation is preferred by many, as being more manageable, in consequence of its not being so deliquescent:—*Potassa (caustica, D.) cum calce*, D. L. E. (“Take of caustic potash; fresh-burned lime, of each, one ounce: rub them both rapidly to powder in a warm mortar, and introduce the mixture with as little delay as possible into a bottle furnished with an air-tight stopper,” D.—“Hydrate of potash, and lime, of each, ʒj. ; rub together and keep in a well-stopped vessel,” L.—“Take any convenient quantity of aqua potassæ; evaporate it in a clean covered iron vessel to one-third its volume; add slaked lime till the fluid has the consistence of firm pulp: preserve the product in well closed vessels,” E.) The preparation of the Dublin and London Colleges should be made into a paste with rectified spirit before it is used.—*Caustic of Filhos*. This preparation is exceedingly useful for cauterizing the neck of the uterus, and is also very generally employed by French surgeons for many other purposes. Some nicety is required for its formation: tubes of lead from 3 to 4 lines in diameter and from 1 to 2 yards in length, are procured, and divided into pieces of a convenient length by means of a piece of cord attached at both extremities to a fixed point, and rolled evenly around the tube where it is wished to cut it. By this method the parietes of the tube are bent inwards, and a small opening only left which is easily closed by means of a hammer and a mandril introduced into the tube; great care must however be taken that the smallest fissure be not left as this would render the tube useless. The

tubes thus prepared are placed in sand or moist clay and filled with the following caustic:—Heat 120 parts of *Potassa cum calce* in a clean iron spoon until it is perfectly fused, when the spoon acquires a dull red heat; and add to it gradually 40 parts of fresh quick lime, stirring with an iron rod, until the whole is intimately mixed. It must be poured while fluid into the tubes. When cold, the parietes of the tubes are thinned with a file as much as possible, care being taken not to penetrate them. These caustic pencils are kept in glass tubes with a little finely powdered quick lime, the orifices being securely closed with corks, a little cotton being placed between the cork and the pencil.—*Caustic powder of Vienna*, (Take of *Potassa cum calce*, 50 parts; quick lime, 60 parts; powder the two substances separately in a warm mortar, and mix them intimately and rapidly; keep in well stoppered bottles.) When required for use, this powder is made into a soft paste with a little spirit and applied to the part it is wished to cauterize.

In cases of poisoning with caustic potash, the best antidotes are, vinegar, lemon-juice, or the fixed oils.

ZINCI CHLORIDUM, D.—*Chloride of Zinc ; Butter of Zinc.*

PREPARATION.—“Take of solution of chloride of zinc, any convenient quantity : evaporate it down in a porcelain capsule, so far, that upon suffering the residual liquor to cool it solidifies. Subdivide the product rapidly into fragments, and enclose them in a well-stopped bottle.”

PHYSICAL PROPERTIES.—In solid pieces, snow-white; inodorous; having a strongly styptic metallic taste.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of chlorine, and 1 of metallic zinc, (Zn Cl); exposed to the air it deliquesces rapidly, being said by many chemists to be the most deliquescent of salts. It is fusible at 212° , and is volatilized at a red heat. It is soluble in water, alcohol and ether.

USES.—Chloride of zinc is a powerful caustic, destroying the vitality of the part with which it is placed in contact; the process being attended with violent burning pain which lasts for five or six hours. It has not been much employed in this country, but on the continent it is in very general use, for the formation of issues; to destroy fungous growths, *naevi materni*, &c.; and as an application to open cancer, in which disease it is said to be productive of the best effects, by inducing a new action in the neighbouring parts; it has been also applied to fungus hematodes, and to various forms of malignant ulcerations. In tooth-ache caused by caries, a minute portion of chloride of zinc introduced into the cavity of the tooth, the carious parts having been previously removed with a silver probe, affords almost immediate relief; the neighbouring parts must be protected with lint, and a small portion of lint is to be put into the hollow of the tooth after the chloride has been applied.

It may be used in the form of lotion, prepared by dissolving the salt in distilled water in different proportions according to the effect required to be produced; or in the form of paste, made by mixing the chloride with from two to five parts of flour. In applying the paste of chloride of zinc, a small space only should be covered with it at a time, and it should be spread in a layer not thicker than from one to two lines. It may be left on from six to eight hours.

CHAPTER VII.

DIAPHORETICS.

(Sudorifics ; Diapnoïcs.)

MEDICINES which augment the cutaneous exhalation are called Diaphoretics; when they increase it to such a degree as to produce sweating, they are called Sudorifics; but as the same remedies are capable of producing both effects, which differ in degree only, I have included them under the one title. Obstructed perspiration, or diseases in which diaphoresis proves useful, may be associated with fever and inflammation, or may occur with a slow languid circulation; the former is indicated by the morbid heat of the surface of the body, and by increased vascular action; the latter by the coldness of the surface, and by general depression of the circulation. It is evident, therefore, that very different remedies will act as diaphoretics in these opposite states of the system. In the former case, those medicines are to be selected for use, which appear to act by relaxing the morbid constriction of the cutaneous capillaries, and at the same time have a direct tendency to lower the action of the heart and arteries; such as *antimonials*, and the *alkaline* and *saline diaphoretics*. In the latter, those remedies are to be employed, which act as stimulants to the cutaneous capillaries, and at the same time increase the general action of the vascular system. In addition to the medicines described in this division, other means are resorted to for the production of diaphoresis; the more important of these are increased muscular action, warm water, and warm vapour or air baths, the cold affusion, and the use of tepid diluent drinks, such as simple water, gruel, whey, &c. During the administration of diaphoretics, it is essential that the surface of the body should be kept warm, and for this purpose a bad conductor of heat, such as flannel, should be employed; care also must be taken to avoid the application of cold, either by exposing the surface of the body to cold air, or by the use of cold drinks while the perspiration continues, or for some time after it has ceased; lastly, where it is wished to check the diaphoresis, this must be done gradually, by drying the surface of the body with dry, warm towels, by diminishing the covering, and by cautiously exposing the hands and arms to the air.

AMMONIÆ ACETATIS LIQUOR, D. L. AMMONIÆ ACETATIS AQUA, E.—*Solution of acetate ammonia ; Mindererus' spirit.*

PREPARATION.—*Dublin*.—"Take of sesquicarbonate of ammonia, in fine powder, two ounces and a half, or a sufficient quantity ; dilute acetic acid, three pints : To the acid, introduced into a bottle, gradually add the sesquicarbonate of ammonia to saturation, and dissolve by shaking, but without the aid of heat. The specific gravity of this solution is 1·012." *London*.—"Sesquicarbonate of ammonia, ℥ivss. , or a sufficiency ; distilled vinegar, Oiv. ; add the salt to the vinegar to saturation." *Edinburgh*.—"Distilled vinegar, from French vinegar in preference, f℥xxiv. ; carbonate of ammonia, ℥j. ; mix and dissolve the salt ; if the solution has any bitterness, add by degrees a little distilled vinegar, till that taste be removed ; the density of the distilled vinegar should be 1·005, and that of the aqua acetatis ammonia, 1·011."

PHYSICAL PROPERTIES.—A transparent colourless liquid, with a very faint odour, and a cooling saline taste. The specific gravity varies with the strength of the solution, that of Dublin is 1·012, that of Edinburgh, 1·011, and that of London somewhat higher.

CHEMICAL PROPERTIES.—It consists of acetate of ammonia dissolved in water ; the proportion of the acetate present varies exceedingly, depending on the strength of the distilled vinegar employed in the preparation. The solution should be perfectly neutral, but is usually faintly acid which is an advantage in relation to its employment in medicine. By careful evaporation crystals of the salt may be obtained, they are very deliquescent. By adding a few drops of sulphuric acid to the solution, an acetous odour is evolved ; caustic potash disengages an ammoniacal odour.

Adulterations.—This solution seldom if ever contains any impurity ; the London and Edinburgh Colleges, nevertheless, have given tests for detecting the presence of metallic matter, and sulphuric or hydrochloric acids ;—the metals, by sulphuretted hydrogen, and the acids, the former by chloride of barium, the latter by nitrate of silver. The solution should be perfectly colourless and of the prescribed density.

THERAPEUTICAL EFFECTS.—Water of acetate of ammonia operates as a diaphoretic with much certainty, and is very generally employed with that intention in febrile and inflammatory affections. Its operation should be promoted by the use of warm drinks and by the surface of the body being kept warm, as otherwise it is apt to pass off by the kidneys. This solution possesses the advantage of not exciting the circulation in any considerable degree, a property which renders it peculiarly adapted for febrile diseases.

DOSE AND MODE OF ADMINISTRATION.— f℥ss. to f℥j. , or f℥ij. , repeated every five or six hours.—*Diaphoretic mixture*, (Solution of acetate of ammonia, f℥ij. ; simple syrup, f℥j. ; orange flower water, f℥j. ; camphor mixture, f℥iv. ; mix). Dose, f℥j. every four hours.

INCOMPATIBLES.—Acids ; potash, and soda, and their carbonates ; lime water ; nitrate of silver ; acetate of lead ; and the metallic sulphates.

ANTIMONII OXIDUM, D. E. *Oxide of antimony; Teroxide of antimony.*

PREPARATION.—*Dublin*.—"Take of solution of terchloride of antimony, sixteen fluid ounces; water, two gallons; solution of caustic potash, one pint; distilled water, a sufficient quantity: Pour the antimonial solution into the water, and, having stirred the mixture well, set it by until the white precipitate which forms has subsided. Draw off the supernatant liquid by decantation, or the syphon, and, having agitated the sediment with a gallon of distilled water, allow the whole to stand till the oxide has fallen to the bottom. Decant again, and having placed the sediment on a calico filter, wash it with distilled water until the liquid which trickles through reddens blue litmus paper only in a very slight degree. The precipitate is now to be shaken occasionally for half an hour, with the solution of caustic potash, and then washed on a filter with boiling distilled water, until the washings cease to give a precipitate on being dropped into an acid solution of nitrate of silver. Lastly, let the product be dried at a heat not exceeding 120° ." *Edinburgh*.—"Sulphuret of antimony, in fine powder, ℥iv. ; muriatic acid (commercial), Oj. ; water, Ov. ; dissolve the sulphuret in the acid with the aid of a gentle heat; boil for half an hour; filter; pour the fluid into the water; collect the precipitate on a calico filter; wash it well with cold water; then with a weak solution of carbonate of soda; and again with cold water till the washings cease to affect reddened litmus paper. Dry the powder over the vapour bath."

PHYSICAL PROPERTIES.—A heavy white powder, sometimes semi-crystalline; inodorous, and perfectly tasteless when pure.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of antimony, and 3 of oxygen, (Sb O_3) Graham. It is permanent in the air, exposed to heat it becomes yellow, and fuses at a red heat, concreting slowly as it cools into a crystalline mass; by a stronger heat it is sublimed in white vapours which condense in the form of crystalline needles. Oxide of antimony is insoluble in water; it is soluble in hydrochloric, tartaric, and acetic acids.

Adulterations.—Not liable to any; that it has been properly prepared is shown by the tests of the *Edinburgh Pharmacopœia*: "Entirely soluble in muriatic acid, and in a boiling mixture of bitartrate of potash and water, fusible at a red heat."

THERAPEUTICAL EFFECTS.—Originally introduced into the *Dublin Pharmacopœia* only for the preparation of tartar emetic; but of late years it has been used as a diaphoretic in the same cases as James' powder, which it appears to resemble much in its action on the system, and which is explained in the next article.

DOSE AND MODE OF ADMINISTRATION.— $\text{Gr. iij. to gr. x.}$; in some instances so large a dose as ℥ss. has proved inert, this however may be owing to faulty preparation. It may be given in the form of pill made with conserve of roses.

ANTIMONII PULVIS COMPOSITUS, L. PULVIS ANTIMONIALIS, D. E.—*Antimonial powder.*

PREPARATION.—The process for preparing James' powder, the quack preparation for which the official is intended as a substitute, is a secret with the proprietor of the nostrum; that for antimonial powder is as follows:—*Dublin*.—"Take of tartarized antimony; phosphate of soda, of each, four ounces; chloride of calcium, two ounces;

solution of ammonia, four fluid ounces; distilled water, one gallon and a half, or a sufficient quantity: Dissolve the tartarized antimony in half a gallon, and the phosphate of soda and chloride of calcium, each, in a quart of the water. Mix the solutions of the tartarized antimony and phosphate of soda when cold, and then pour in the solution of chloride of calcium, having first added to the latter the water of ammonia. Boil now for twenty minutes, and, having collected the precipitate, which will have then formed, on a calico filter, wash it with hot distilled water until the liquid which passes through ceases to give a precipitate with a dilute solution of nitrate of silver. Finally, dry the product by a steam or water heat, and reduce it to a fine powder." *London*.—"Sesqui-sulphuret of antimony, powdered, ℥bj.; horns, shaved, ℥ij.; mix and throw them into a crucible red hot in the fire, and stir constantly till vapour no longer arises. Rub that which remains to powder, and put it into a proper crucible. Then apply fire, and increase it gradually that it may be red hot for two hours. Rub the residue to very fine powder." *Edinburgh*.—"Sulphuret of antimony, in coarse powder; and hartshorn shavings, of each, equal parts; mix and put them into a red hot iron pot, and stir constantly till they acquire an ash-grey colour, and vapour no longer arises. Pulverise the product, and put it into a crucible with a perforated cover, and expose this to a gradually increasing heat till a white heat be produced, which is to be maintained for two hours. Reduce the product when cold to a fine powder."

PHYSICAL PROPERTIES.—A dull white powder, tasteless and odourless; feeling gritty under the teeth in consequence of its being in general rather coarsely powdered. The empirical preparation "James' powder," resembles it both in physical and chemical properties, except in being in a state of much more minute division: the Dublin preparation being prepared by precipitation is, however, an equally fine powder.

CHEMICAL PROPERTIES.—According to the accurate experiments of Dr. Douglas Maclagan of Edinburgh, the composition of both preparations appears to be similar, but the proportions of the different ingredients present vary remarkably in different specimens. They consist of from $\frac{1}{2}$ to $2\frac{1}{2}$ per cent. of the antimonite of lime, and from 4 to 10 per cent. of sesquioxide of antimony, to the presence of both of which, chiefly the latter, the activity of the preparation is due: the remainder being inert antimonious acid, and phosphate of lime. Boiling water dissolves the antimonite of lime which is deposited as the solution cools; hydrochloric acid dissolves the sesquioxide of antimony and the phosphate of lime. Antimonial powder, as prepared by the process of combustion and incineration as directed in the pharmacopœias, is liable to vary much in its nature. To prevent this, Chenevix suggested the preparation of antimonial powder in the moist way, and a modification of his process has been introduced into the last Dublin Pharmacopœia; but I doubt much that the compound thus obtained will resemble in its effects that obtained by the old method.

Not liable to adulteration; but as before remarked, it varies much in activity, the empirical preparation being more uniform in character, and consequently more generally preferred notwithstanding its high price.

THERAPEUTICAL EFFECTS.—Antimonial powder and James' powder, though frequently even in very large doses not producing the least apparent effect on the system, more generally operate as pow-

erful diaphoretics, causing copious sweating without much excitement or disturbance of the circulation. They are generally employed in the early stages of febrile diseases, and in inflammatory affections; they have also been given in chronic skin diseases, and combined with calomel and opium in acute rheumatism. In consequence of the uncertainty of their operation, and the very high price at which the patent nostrum is sold, many practitioners at present prefer employing tartar emetic, from which, when administered with proper regulation of the doses, we can obtain similar effects with much greater certainty. The late Dr. Cheyne employed James' powder with excellent effect in the after-treatment of apoplexy, to equalise the circulation and thereby prevent a return of the fit; and his practice has been very generally adopted by the physicians of this city with the most beneficial results. He at first gave two grains for a dose at bed-time and increased it half a grain every night, until eighteen grains were taken at one dose, unless vomiting or purging were previously produced by it.

DOSE AND MODE OF ADMINISTRATION.—In powder, from gr. iij. to gr. x., repeated every four or five hours; or it may be made into pill with conserve of roses or any of the vegetable extracts.—*Diaphoretic pill*, (Antimonial or James' powder, gr. ij.; extract of conium or of hyoscyamus, gr. j.; to be made into one pill). It should be repeated every six hours.

ANTIMONII SULPHURETUM, D. E. ANTIMONII SESQUISULPHURETUM, L.—*Sulphuret of antimony; Crude antimony.*

PREPARATION.—An article of the *Materia Medica* in the three British pharmacopœias; prepared by fusing the ore in a perforated crucible placed over another destined to receive the melted mass; the Dublin College directs it to be further purified by the process of levigation and elutriation as for prepared chalk (*Antimonii sulphuretum præparatum*).

PHYSICAL PROPERTIES.—In conical masses or loaves, of a bluish-grey colour, staining the fingers or paper black, with a brilliant, metallic, crystalline fracture; it is inodorous and tasteless, is easily pulverised, and yields a black powder. Specific gravity, 4·6.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of antimony, and 3 of sulphur, ($\text{Sb} + 3 \text{S}$) Graham. It is permanent in the air, exposed to a moderate heat it fuses, and at a red heat it volatilizes. It is insoluble in water; with the aid of heat it is completely dissolved by hydrochloric acid with the disengagement of sulphuretted hydrogen gas.

Adulterations.—Although not liable to adulteration, as met with in commerce it contains many impurities; most of these are detected by dissolving in hydrochloric acid; but there is one of much importance which this test will not detect, and which is seldom wanting, namely, arsenic: its presence may be shown by the reduction test as before described for arsenic (page 144), the sulphuret having been previously mixed with charcoal and carbonate of soda.

THERAPEUTICAL EFFECTS.—This preparation is not at present used in medicine; it was formerly administered as a diaphoretic in doses of from gr. x. to ʒij., in cutaneous and scrofulous diseases, and in gout and rheumatism. It is employed in pharmacy for preparing the other antimonial compounds.

ANTIMONII SULPHURETUM PRÆCIPITATUM, D. ANTIMONII SULPHURETUM AUREUM, E. ANTIMONII OXYSULPHURETUM, L.—*Precipitated sulphuret of antimony; Golden sulphuret of antimony; Oxy-sulphuret of antimony.* (Syn. *Sulphur antimoniatum fuscum, D.*)

PREPARATION.—*Dublin.*—"Take of prepared sulphuret of antimony, five ounces; carbonate of potash from pearl-ash, first dried by a low red heat, and reduced to powder, four ounces; water, one gallon; pure sulphuric acid, two fluid ounces; distilled water, one quart: Mix the sulphuret of antimony and carbonate of potash in a mortar, and heat the mixture in a Hessian crucible, first cautiously until effervescence ceases, and then to low redness, so as to produce liquefaction. Pour out the melted mass on a clean flag, and, when it has concreted and cooled, rub it to a fine powder in a porcelain mortar. Add this, in successive portions, to the gallon of water while boiling in an iron vessel, and, having maintained the ebullition for twenty minutes, transfer the whole to a calico filter, and cause the solution which passes through to drop into the distilled water previously mixed with the sulphuric acid. Let the precipitate which forms be collected on a calico filter, and let warm distilled water be repeatedly poured upon it, until the liquid which passes through ceases to give a precipitate when dropped into a solution of nitrate of barytes. Finally, dry the product on porous bricks placed in a warm atmosphere." *London.*—"Sesquisulphuret of antimony, powdered, ʒvij.; solution of potash, Oiv.; distilled water, cong. ij.; dilute sulphuric acid, a sufficiency; mix the sesquisulphuret of antimony, solution of potash and water together; and boil with a slow fire for two hours, frequently stirring, distilled water being often added, that it may fill about the same measure; strain the liquor, and gradually drop into it as much diluted sulphuric acid as may be sufficient to throw down the oxysulphuret of antimony; then wash away the sulphate of potash with water, and dry what remains with a gentle heat." *Edinburgh.*—"Sulphuret of antimony, in fine powder, ʒj.; solution of potash, fʒxj.; water, Oij.; mix the water and solution of potash, add the sulphuret, boil for an hour, filter immediately, and precipitate the liquid while hot, with an excess of diluted sulphuric acid; collect the precipitate on a calico filter, wash it thoroughly with water, and dry it with a gentle heat."

PHYSICAL PROPERTIES.—A light powder of a bright orange colour, odourless and tasteless when pure.

CHEMICAL PROPERTIES.—Its chemical composition has not been accurately ascertained; in the Edinburgh Pharmacopœia it is stated to be a mixture or compound of sesquisulphuret of antimony, sesquioxide of antimony, and sulphur. It is permanent in the air, heated in close vessels, sulphur is sublimed; but if heated in contact with air it burns with a greenish-blue flame, evolving sulphurous acid and leaving a greyish residuum. It is insoluble in water, and only partially soluble in dilute acids; with the aid of heat it is nearly all dissolved by solutions of the alkalies.

Adulterations.—This preparation often contains oxide of iron and sulphur, and is frequently coloured with Brazil-wood or red Saunders-wood: all these impurities are readily detected by the tests of the Edinburgh College: "twelve times its weight of pure muriatic acid,

aided by heat, dissolves most of it, forming a colourless solution and leaving a little sulphur."

THERAPEUTICAL EFFECTS.—The golden sulphuret of antimony possesses diaphoretic properties, in large doses producing nausea and vomiting; it is seldom employed alone, but, in the following preparation is in very general use as a diaphoretic and alterative.—*Pilulæ Calomelanos compositæ*, D. E. ("Take of calomel; precipitated sulphuret of antimony, of each, one drachm; guaiacum resin, in powder, two drachms; castor oil, one fluid drachm: triturate the calomel with the antimony, then add the resin and oil, and beat the whole into a uniform mass," D.—"Calomel; and golden sulphuret of antimony, of each, one part; guaiacum, in fine powder, two parts; make into a pill mass with two parts of treacle; to be divided into six-grain pills," E.).—*Pilulæ Hydrargyri Chloridi compositæ*, L. (Chloride of mercury; oxysulphuret of antimony, of each, 3ij.; guaiacum resin, powdered, 3ss.; treacle, 3ij.; rub the chloride of mercury with the oxysulphuret of antimony, afterwards with the guaiacum resin and the treacle until incorporated). This compound is commonly known as *Plummer's Pill*; it is an excellent diaphoretic and alterative, well adapted for cutaneous eruptions, especially those of a syphilitic origin; Dose, gr. v. to gr. x. or gr. xv.; about five grains (four grains, L.) (six grains, E.), contain one grain each of calomel and of the golden sulphuret of antimony.

INCOMPATIBLES.—Acids; and acidulous salts.

ANTIMONIUM TARTARIZATUM, D. E. ANTIMONII POTASSIO-TARTRAS, L. *Tartarized antimony; Tartrate of antimony and potash; Tartar emetic.* (Syn. *Antimonii et potassæ tartras sive tartarum emeticum.* D.)

PREPARATION.—*Dublin.*—"Take of oxide of antimony, five ounces; white bitartrate of potash, six ounces; distilled water, one quart: rub the bitartrate to a fine powder, and, having carefully mixed with it the oxide of antimony, add a little water, so as to convert the mixture into a thick paste, which should be set by for twenty-four hours. Pour on this the remainder of the water, previously raised to the temperature of 212°, and, having boiled for fifteen minutes, with repeated stirring, in a glass or porcelain vessel, filter through calico, returning the slightly turbid liquid which first passes through, so as to obtain a clear solution. After twelve hours let the solution be decanted from the crystals which will have formed, and boiled down to one-third, when, upon cooling, an additional product will be obtained. The salt, after being dried upon blotting paper, without the application of heat, should be preserved in a bottle." *London.*—"Sesquisulphuret of antimony, in powder; nitrate of potash, powdered, of each, lbij.; bitartrate of potash, powdered, 3xiv.; hydrochloric acid, f3iv.; distilled water, cong. j.; mix accurately the sesquisulphuret of antimony with the nitrate of potash; the hydrochloric acid being then added, and the powder spread upon an iron plate, ignite it; rub the residue to very fine powder when it is cold, and wash it frequently with boiling water until it is free from taste; mix the powder thus prepared with the bitartrate of potash, and boil for half an hour in the distilled water; strain the liquor while hot, and set it aside that crystals may be formed; these being removed and dried, let the liquor again evaporate that it may yield crystals." *Edinburgh.*—"Sulphuret of antimony, in fine powder, 3iv.; muriatic acid (commercial), Oj.; water,

Ov. ; dissolve the sulphuret in the acid with the aid of a gentle heat ; boil for half an hour, filter, pour the liquid into water, collect the precipitate on a calico filter, wash it with cold water, till the water ceases to reddens litmus paper ; dry the precipitate over the vapour bath. Take of this precipitate, ℥ij . ; bitartrate of potash, $\text{℥iv} \frac{1}{4}$; water, f℥xxvij . ; mix the powders, add the water, boil for an hour, filter and crystallize by cooling. The mother liquor when concentrated yields more crystals not so free from colour, and therefore requiring a second crystallization."

PHYSICAL PROPERTIES.—Tartar emetic is met with in the shops either in the form of a white powder, or in transparent colourless crystals, which are octahedrons with a rhombic base. It is inodorous, but has a styptic nauseous taste.

CHEMICAL PROPERTIES.—It is composed of one equivalent of potash, one of teroxide of antimony, one of tartaric acid, and three equivalents of water, $(\text{KO}, \text{Sb O}^3, \text{C}^8 \text{H}^4 \text{O}^{10} + 3 \text{HO})$. The crystals effloresce in the air, soon becoming white and opaque, and losing their water of crystallization. Strongly heated the salt is decomposed, and an alloy of antimony and potash is obtained. It is soluble in 15 parts of cold and in 3 parts of boiling water; it is insoluble in alcohol. The solution gives *white* precipitates with oxalic and sulphuric acids, caustic potash, and lime water; *straw coloured* with infusion of nutgalls; and *bright orange-red* with sulphuretted hydrogen or the soluble hydrosulphates; the latter is the most characteristic test.

Adulterations.—In the crystalline state, this salt is seldom adulterated; in a few instances I have found crystals of sulphate of potash mixed with those of tartar emetic, evidently an intentional fraud, but one easy of detection, as crystals of tartar emetic when dropped into a solution of sulphuretted hydrogen have an orange-coloured deposit formed on them. The powder is very commonly adulterated with cream of tartar, and from being badly prepared frequently contains a large quantity of the oxide of iron; both impurities are readily detected by the tests of the Edinburgh Pharmacopœia: "Entirely soluble in 20 parts of water, solution colourless, and not affected by solution of ferrocyanide of potassium; a solution in 40 parts of water is not affected by its own volume of a solution of 8 parts of acetate of lead in 32 parts of water, and 15 parts of acetic acid."

THERAPEUTICAL EFFECTS.—In properly regulated doses, tartar emetic produces diaphoresis more uniformly and more certainly than any other of the antimonial preparations; nausea sometimes accompanies its diaphoretic action, but this is attended with the advantage of placing the system in a condition in which sweating is more freely produced. In all the varieties of febrile diseases, especially when a determination of blood to the head forbids the use of the more stimulating diaphoretics, tartar emetic is employed with great benefit. It has also been used with much advantage in obstinate cutaneous diseases, administered in decoction of sarsaparilla or in decoction of elm bark if much debility be present. The employment of the antimonial preparations generally is contraindicated in diseases where gastric irritation is present. (See, *Epispastics*, *Emetics* and *Sedatives*)

DOSE AND MODE OF ADMINISTRATION.—1-12th to 1-6th of a grain frequently repeated; it may be administered dissolved in a large quantity of distilled water without any flavouring adjunct; thus, gr. ij. may be dissolved in Oj. of water, and f̄3j. of this taken every hour until sweating be produced; given in the form of pill, however, it is less apt to excite vomiting than when in solution. The following is used as a substitute for James' powder:—Tartar emetic, gr. j.; sulphate of potash, in fine powder, gr. xx.; mix. Dose, gr. ij. to gr. iij., every hour.—*Liquor Antimonii Tartarizati*, D. *Vinum Antimonii Potassio-tartratis*, L. *Vinum Antimoniale*, E. ("Take of tartarized antimony, one drachm; distilled water, one pint; rectified spirit, seven fluid ounces: having dissolved the tartarized antimony in the water, and cleared the solution by passing it through a paper filter, add the spirit, and preserve the product in a well-stopped bottle," D.—"Dissolve gr. xl. of tartar emetic in Oj. of Sherry," L. E.). Every fluid ounce contains gr. ij. (gr. ij. and about the fiftieth part of a grain, D.) of tartar emetic; Dose as a diaphoretic, min. xx. to min. xxx., every hour.

INCOMPATIBLES.—The acids; the alkalies, and their carbonates; lime water; chloride of calcium; the earths; some of the metallic oxides; hydrosulphurets; the acetates of lead; corrosive sublimate; decoctions and infusions of most of the bitter and astringent vegetables, as those of cinchona, rhubarb, galls, catechu, &c. The solution in water spoils by keeping.

DULCAMARA, D. L. E. *The twigs (stems, L.) of Solanum dulcamara*; *Woody nightshade*; *Bitter-sweet*.—Indigenous, growing in hedges and thickets. It belongs to the Natural family *Solanaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Stems, shrubby, twining and branching; Leaves, cordate, upper ones hastate; Flowers, elegant, purple, in drooping clusters; Anthers, large, yellow, united into a pyramidal or cone-shaped figure; Berries, scarlet juicy.

PREPARATION.—The stems or twigs are gathered in autumn when the leaves have fallen off, and dried with the heat of a stove. Those stems of the thickness of a goose-quill are usually selected.

PHYSICAL PROPERTIES.—The twigs, as met with in the shops, are dark brown externally, white within, light and spongy in the centre; when fresh they have a faintly nauseous odour, which is lost by drying; the taste is at first bitter, afterwards sweetish, whence the name bitter-sweet is applied to the plant.

CHEMICAL PROPERTIES.—According to the analysis of Desfosses, dulcamara contains, besides some salts of lime and potash and other unimportant substances, a peculiar alkaline principle, insoluble in water, soluble in alcohol and ether, pulverulent, inodorous, white, permanent in the air, which he has called *Solanina*—it appears to be a narcotic, but its medical properties have not been yet fully examined. Bitter-sweet yields its active properties to both water and alcohol.

THERAPEUTICAL EFFECTS.—A decoction has been employed as a diaphoretic in rheumatic and venereal affections, and in chronic diseases of the skin. Its medical properties are, however, very feeble, and in the present day it is not much used in this country.

DOSE AND MODE OF ADMINISTRATION.—*Decoctum Dulcamaræ*, D. L. E. ("Take of twigs of woody nightshade, dried, half an ounce; water, half a pint: boil for ten minutes, in a covered vessel, and strain. The product should measure about eight ounces," D.—"Dulcamara twigs, chopped, ʒj.; water, fʒxxiv.; boil down to fʒxvj.; and strain," L. E.). Dose, fʒj. to fʒij. two or three times a day.

GUAIACI LIGNUM, D. L. E.—*Wood of Guaiacum officinale; Lignum-vitæ.*

GUAIACI RESINA, D. L. GUAIIACUM, E.—*Resin (obtained by heat from the wood, E.) of Guaiacum officinale.* This tree is a native of Jamaica, of St. Domingo, and of many other West India islands; it belongs to the Natural family *Zygophyllaceæ*, and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL CHARACTERS.—A tree attaining a height of 30 or 40 feet, with a crooked stem, and a hard, heavy wood; Leaves evergreen, bijugate; Flowers, pale blue, in clusters in the axillæ of the upper leaves; Fruit, yellow, obovate, coriaceous.

PREPARATION.—The wood is divided into logs or billets; and the resin is obtained, as a spontaneous exudation from cracks or fissures in the stem, or by incisions made into it; or artificially procured, by heating one end of billets of the wood which have been previously bored lengthwise, until the resin flows out of the opposite extremity; or by boiling the chips and raspings of the wood in a strong solution of common salt, when the resin swims on the surface of the liquid.

PHYSICAL PROPERTIES.—GUAIIACUM WOOD, commonly termed *Lignum-vitæ*, is imported in logs or billets about nine inches in diameter and of various lengths; it is extremely hard, consisting of an outer circle of young wood (*alburnum*) of a pale yellow colour, and a centre of old wood (*duramen* or *heart-wood*) of a dark green colour; its density is 1.333, so that it sinks when thrown into water. For medical uses the wood is rasped or shaved into coarse powder (*scobs vel rasura guaiaci*); in which state it has an acrid resinous taste, and a peculiar aromatic odour. GUAIIACUM RESIN is a semi-transparent solid, breaking with a vitreous fracture, the fractured surface varies much in colour, being partly brownish, partly reddish, and partly greenish, but it always becomes green when exposed to the light and air. The odour and taste are similar to, but stronger than those of the wood. The specific gravity is 1.29.

CHEMICAL PROPERTIES.—Guaiacum wood consists of a peculiar acrid principle, and its proper resin, besides gummy matter, mucous extractive, lignin, &c. Its active properties are probably due to the acrid matter as well as to the resin. The latter, the physical properties of which have been described above, as met with in commerce, consists of the true resin—*guaiacic acid*, with a trace of gum, extrac-

tive matter, and woody fibre; it is insoluble in water and in the fixed oils, but is soluble in alcohol and in solutions of the alkalis. The alcoholic solution is precipitated by water and by hydrochloric acid, but not by acetic acid; nitric acid occasions no change at first, but after some hours the liquid becomes green, then blue, and at last a brown precipitate falls down; dropped on flour or on a transverse slice of a potato, a blue colour is produced on exposure to the air. Guaiacum resin is fused by heat; according to M. Deville, its composition is $C^{12} H^8 O^6$.

Adulterations.—Various resinous substances are frequently mixed with, or substituted for, guaiacum; the substitution may be readily detected by applying the tests of the Edinburgh Pharmacopœia for the true resin.—“Fresh fracture red, slowly passing to green. The tincture slowly strikes a lively blue colour on the inner surface of a thin paring of a raw potato.” The adulteration with colophony or any of the pine resins may be detected by the partial solubility of the suspected article in hot oil of turpentine, which does not act on the true resin. The shavings may readily be distinguished from those of any other wood by the action of nitric acid, which communicates to them a temporary bluish-green colour.

THERAPEUTICAL EFFECTS.—Guaiacum wood and its resin are stimulating diaphoretics, and are consequently inadmissible in all states of excitement or acute inflammation of the system. They are well adapted for chronic rheumatism of the old or debilitated; for the atonic stages of gout; for chronic diseases of the skin, especially those of a syphilitic origin, or occurring in scrofulous habits; and for all the forms of secondary syphilis, provided there is no irritation or inflammatory tendency in the alimentary canal. When first introduced into the practice of medicine, they were believed to possess anti-venereal virtues, little if at all inferior to mercury.

DOSE AND MODE OF ADMINISTRATION.—The resin may be given in powder in doses of from gr. x. to ʒss.; it may be administered in the form of bolus made with treacle or conserve of roses; or suspended in water by means of mucilage. The wood is not administered in powder.—*Decoction Guaiaci*, E. (Guaiac turnings, ʒiij.; sassafras, rasped, ʒj.; liquorice root, bruised, ʒj.; raisins, ʒij.; water, Oviij.; boil the guaiac and raisins in the water down to Ov., adding the liquorice and sassafras towards the close; strain the decoction). The old *decoction of the woods*, a sudorific in doses of fʒiv., two or three times a day.—*Mistura Guaiaci*, L. E. (Guaiacum resin, ʒiij.; sugar, ʒss.; mucilage, fʒss.; cinnamon water, fʒxix.; rub the guaiac with the sugar and mucilage, adding gradually the cinnamon water). Dose, fʒss. to fʒij., two or three times a day.—*Tinctura Guaiaci*, D. L. E. (Guaiacum-resin, in fine powder (bruised, L., in coarse powder, E.), ʒviij. (ʒviij., L. E.); rectified spirit, Oij.; macerate for 14 (7, E.) days (strain, express, D.) and filter). Dose, fʒj. to fʒss.; it is decomposed by water, it should therefore be suspended in aqueous vehicles by means of sugar or mucilage.—*Tinctura Guaiaci ammoniata*, E. *Tinctura Guaiaci composita*, L. (Guaiacum-resin, bruised (in coarse

powder, E.), ʒvij.; aromatic spirit of ammonia (spirit of ammonia, E.), Oij.; macerate for 7 (14, L.) days and filter). The best of its official preparations; Dose, fʒj. to fʒij., exhibited as the preceding.—*Syrupus Guaiaci*, AUGUSTIN. (Ammoniated tincture of guaiacum, fʒij.; mucilage; and syrup of almonds, of each, fʒj.; mix). An elegant formula; Dose, fʒj. to fʒij.

INCOMPATIBLES.—The mineral acids; and spirit of nitric ether.

IPECACUANHÆ PULVIS COMPOSITUS, D. L. E. *Compound powder of Ipecacuanha; Dover's powder.*

PREPARATION.—“Ipecacuan, in fine powder; and opium (hard, L.), in fine powder, of each, ʒj. (ʒj., E.); sulphate of potash, ʒj. (ʒviii. E.); mix intimately (thoroughly by trituration, and pass the powder through a fine sieve,” D.).

PHYSICAL PROPERTIES.—A brownish-yellow powder, with an opiate odour, and a bitter, saline, slightly acrid taste.

CHEMICAL PROPERTIES.—It is composed of one part each of powdered ipecacuanha and opium, and eight parts of powdered sulphate of potash. The prescriber must bear in mind that in consequence of the change in the weights directed to be employed by the Dublin College, although the proportion in parts remains the same, ʒj. of Dover's powder contains about five and a half, and not six grains each of ipecacuanha and opium. It is insoluble in water or in alcohol. If this powder be kept for any length of time in a bottle without being occasionally shaken, the sulphate of potash will sink to the bottom, and consequently the upper strata will contain more than the proper proportions of the lighter powders—the opium and ipecacuanha: accidents might thus occur in dispensing.

THERAPEUTICAL EFFECTS.—One of the most powerful and most generally employed sudorifics, possessing properties which do not belong to any of its ingredients separately. Its employment is contraindicated in cases attended with irritability of the digestive organs, or where there is cerebral disturbance. It is especially adapted for the milder forms of catarrh, coryza, acute rheumatism, and general dropsy accompanied by suppressed or diminished perspiration, particularly when the urine is albuminous.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xx., in pill or in bolus made with conserve of roses. The surface of the body should be kept warm, and as a precaution against vomiting the patient should not be permitted to drink for some time after taking the medicine. Every ten grains of Dover's powder contain one grain each of opium and ipecacuanha.—*Pilula Ipecacuanhæ et Opii*, E. (Compound ipecacuan powder, 3 parts; conserve of red roses, 1 part; beat them into a proper mass which is to be divided into gr. iv. pills). Dose, gr. iv. to gr. viij.

MEZEREON, D. E. MEZEREUM, L.—*The root-bark of Daphne*

Mezereum. An indigenous shrub, belonging to the Natural family *Thymelacææ*, and to the Linnæan class and order *Octandria Monogynia*.

BOTANICAL CHARACTERS.—Stem, woody, branching, covered with a smooth greenish-grey cuticle; Leaves, scattered, smooth, lanceolate; Flowers, pale-rose colour, highly fragrant, appearing before the leaves, in little tufts on the naked branches; Berries, scarlet.

PREPARATION.—Although the Colleges direct the bark of the root to be employed, as met with in the shops it appears to have been removed as well from the branches. The bark is collected in spring, being then most active, and dried with stove heat.

PHYSICAL PROPERTIES.—The root is generally entire, of various lengths, sometimes branching; externally it is covered with the bark which is of a brown colour, smooth and wrinkled; in the centre is the white, hard, tasteless wood: between it and the outer bark the inner bark is white and cottony; the thickness of the root varies from that of a quill to that of the little finger. The bark (*cortex mezerei*) is in pieces of various lengths, quilled, tough, and pliable; it is covered with the olive-brown, tasteless epidermis; the true bark is of a greenish-white colour, and fibrous. It has a slight, nauseous odour; the taste is at first faint, but leaves a hot acrid impression upon the tongue and fauces; in the fresh state the bark has a very acrid taste.

CHEMICAL PROPERTIES.—The inner bark of the mezereon contains a neutral crystalline principle which has been named *daphnin*, and an acrid resin, in combination with wax, sugar, colouring matter, woody fibre, &c. It yields its active principles to water and to alcohol.

Adulterations.—Various similar barks and roots are either mixed with, or substituted for, mezereon; they may be distinguished by not having the same acrid taste. The woody part, which constitutes the greater portion of the root, is perfectly inert, and consequently should not be employed.

THERAPEUTICAL EFFECTS.—Mezereon is a stimulating diaphoretic, but its properties as such are very feeble in comparison to its acridity, in consequence of which it is not much employed at present. It was formerly in high repute as an efficacious remedy for venereal nodes, and in other forms of secondary syphilis. (See, *Epispastics*).

DOSE AND MODE OF ADMINISTRATION.—In decoction, in doses of fʒiv. or fʒv., three or four times a day.—*Decoctum Mezerei*, (Mezereon bark, ʒij.; liquorice root, bruised, ʒss.; water, ℥ij.; boil down to ℥ij. and strain). This decoction has been omitted from the last Dublin Pharmacopœia. Mezereon root-bark enters into the composition of the compound decoction of sarsaparilla.

SARZA, L. E. SARSAPARILLA, D. *Root of Smilax officinalis, D. L.—and probably also of other species, E. Sarsaparilla.* The various species of the genus sarsaparilla, from which the medicinal root is obtained, are inhabitants of the warmest regions of South America,

especially Peru and Mexico. They are placed in the Natural family *Smilacæ*, and in the Linnaean class and order *Dioecia Hexandria*.

BOTANICAL CHARACTERS.—Dioecious creepers; Perianth, six parted; Male flowers, with six stamens; Female, with a 3-celled ovary, each cell one seeded; Berry, 3-celled, containing one to three roundish seeds.

PREPARATION.—The roots are dug up at all seasons of the year, and dried by the heat of the sun.

PHYSICAL PROPERTIES.—Several varieties of sarsaparilla are met with in English commerce; the most important of these are, Jamaica, Honduras, Brazil, and Lima Sarsaparilla. They are met with in bundles formed of the folded roots, in the Brazilian variety the roots are unfolded: the bundles are generally from twenty inches to three feet in length; the roots consist of a rhizome, the *chump* of druggists (which, however, is frequently absent), and of numerous rootlets several feet in length, about the thickness of a writing pen, cylindrical, flexible, wrinkled longitudinally, with more or less root-fibres attached to them; of a reddish-yellow or brown colour externally, the inner bark being rose-coloured and more or less mealy, and the centre (*meditullium*), woody, whitish and shining. Sarsaparilla has scarcely any odour, the taste is mucilaginous, slightly nauseous, leaving an acrid sensation on the back part of the tongue and fauces. *Jamaica Sarsaparilla*, which, is most probably the produce of *Smilax Officinalis*, has a lively red tint, and more attached root-fibres than the other sorts, whence it is sometimes called *red-bearded sarsaparilla*, it is the most esteemed. *Honduras Sarsaparilla* is of a greyish-brown colour, and has but few rootlets attached; the inner bark is so amylaceous, that when the root is rubbed or broken, a white mealy powder is driven out of it; this is the sort generally used in the shops for cutting into chips: it is conjectured by Guibourt to be the root of *Smilax Sarsaparilla*. *Brazilian Sarsaparilla*, which, according to Martius, is the produce of *Smilax papyracea*, resembles the last in colour and mealiness, but is almost free from rootlets, and the *chump* is not attached. *Lima Sarsaparilla* resembles in appearance Jamaica, for which it is often sold, its colour, however, is grayish-brown, and the *chump* is invariably attached, being folded into the centre of the bundle.

CHEMICAL PROPERTIES.—Various analyses have been made of sarsaparilla; it appears to consist of volatile oil, nearly all of which is lost during the process of drying, of a peculiar white crystallizable neutral principle, which has been named *smilacin* (*paraglin*, *salseparine*, *parallinic acid*, of various chemists), acrid bitter resin, lignin, starch, and mucilage. According to Petersen the composition of *smilacin* is $C^{15} H^{13} O^5$. Sarsaparilla yields its active properties to boiling water by simple maceration; and the continued boiling, to which it is submitted by the directions of the colleges, for preparing the decoctions, the syrup, and the extracts, is not only perfectly useless, but highly injurious, and to this fact we may ascribe the great discrepancy of opinion which exists as to the medicinal properties of the drug.

Adulterations.—The roots of various allied species which do not possess any medicinal property whatsoever, are mixed in America with the true sarsaparilla; and in this country the inferior sorts are sold for the finer qualities. The former fraud may be detected by the taste, which is the surest criterion; the latter by attending to the characters of the different species as given above.

THERAPEUTICAL EFFECTS.—Notwithstanding the little esteem that sarsaparilla is held in by many practitioners, a medicine possessing the great activity that it does in the recent state, as described by Dr. Hancock, can scarcely be inert; unless, as before observed, we destroy its medicinal properties by the pharmaceutical processes to which it is submitted. Under its use, undoubtedly, diaphoresis is frequently produced, and secondary syphilitic affections, especially nocturnal pains, ulcerations of the throat, and cutaneous eruptions have been speedily cured; these effects, however, have been ascribed by many, and I must say with much reason, to the restricted diet to which patients are submitted while undergoing what is called an alterative course. The question of the powers of sarsaparilla in secondary syphilis is worthy of still further investigation, particularly if we consider the high price of the drug, and the great expenditure which its use in hospitals and public charities entails on these institutions; for my own part I consider that its effects have been very much overrated; and in the treatment of cutaneous eruptions, whether of syphilitic origin or not, I very rarely use it now, as I have found by experience that fresh Elm-bark (See, *Tonics*), acts with much more certainty. In the two former editions of this work I expressed the opinion that in any future trials of the efficacy of this medicine it would be well to use a simple infusion, prepared with boiling water in the same manner and of the same strength as the compound infusion of the Dublin Pharmacopœia of 1826, substituting boiling distilled water for the lime water ordered in that formula; and I am pleased to find that the Dublin College has in its last edition substituted a decoction and compound decoction for those previously contained, in both of which the prolonged boiling has been reduced to a period of 10 minutes.

DOSE AND MODE OF ADMINISTRATION.—In powder the dose is from ʒj. to ʒij.; it is very seldom administered in this form; but if the powder is good, as may be ascertained by the taste, it ought to prove the best mode of giving the medicine, it may be made into a bolus with honey.—*Decoctum Sarsaparillæ*, D. *Decoctum Sarzæ*, L. E. (Sarsaparilla, sliced, ʒij. (ʒv., L. E.); boiling (distilled, L.) water, Oiss. (Oiv. L. E.); “digest the sarsaparilla with the water for one hour, then boil for ten minutes in a covered vessel, cool and strain. The product should measure a little more than a pint,” D. “Digest with a medium heat (near the fire, L.) for 4 (2, E.) hours in a vessel lightly covered; take out the root, bruise and replace it; (macerate for two hours further, L.) boil down to Oij., then squeeze and strain,” L. E.). Dose, fʒiv. to fʒviij., three or four times a day.—*Decoctum Sarsaparillæ* (*Sarzæ*, L. E.) *compositum*, D. L. E. (“Take of sarsa-

parilla root, sliced, two ounces; sassafras root, in chips; guaiacum wood, turnings; liquorice root, bruised, of each, two drachms; mezereon root bark, one drachm; boiling water, one pint and a-half. Digest all the ingredients with the water, in a covered vessel, for one hour, then boil for ten minutes, cool, and strain. The product should measure a little more than a pint," D.—"Decoction of sarsaparilla, boiling, Oiv.; sassafras chips; guaiac turnings; bruised liquorice root, of each, 3x.; mezereon, 3iij. (3iv. E.); boil for a quarter of an hour and strain," L. E.). The old *decoction of sweet woods*; Dose, f3iv. to f3vj., three or four times a day.—*Extractum Sarzæ*, L. (Sarsaparilla, sliced, 1biiss.; boiling distilled water, cong. ij.; macerate for 24 hours, then boil down to cong. j., and strain the liquor while yet hot; lastly, evaporate to a proper consistence). Dose, 3ss. to 3ij.—*Extractum Sarsaparillæ fluidum*, D. ("Take of sarsaparilla, one pound; boiling water, eight pints; rectified spirit, as much as is sufficient. Digest the sarsaparilla in five pints of the water for two hours, at a temperature near 212°, and then decant. Add the rest of the water, digest again for two hours, and decant. Evaporate the mixed liquors by a steam or water heat to the consistence of a thin syrup, and, when the product has cooled, add as much rectified spirit as will make the entire twenty ounces").—*Extractum Sarzæ fluidum*, E. (Sarsaparilla chips, 1bj.; boiling water, Ovj.; digest the root for 2 hours in 4 pints of the water, take it out, bruise and replace it, and boil for 2 hours; filter and squeeze out the liquor; boil the residue in the remaining 2 pints of water, and filter, and squeeze out this liquor also; evaporate the united liquors to the consistence of syrup; add, when the product is cool, as much rectified spirit as will make in all f3xvj.—This fluid extract may be aromatized with volatile oils or warm aromatics). The fluid extract of the Dublin Pharmacopœia is a judicious substitute for that contained in the former edition; that of the Edinburgh Pharmacopœia must be an inert preparation from the prolonged boiling to which it is submitted. The fluid extract is used as an adjunct to the decoction or taken diluted with water. Dose, f3ss. to f3j.—*Syrupus Sarzæ*, L. E. (Sarsaparilla chips, 3xv.; boiling water, cong. j.; infuse the sarsaparilla in the water for 24 hours; then boil down to Oiv., and strain the liquor while hot; and add sugar (3xv., L.) so as to make a syrup). Dose, f3iv. to f3vj., diluted with water, or as an adjunct to the decoction.

INCOMPATIBLES.—Lime water; and the acetates of lead.

SASSAFRAS, D. L. E.—*The root of Sassafras officinale*, D. E.—*of Laurus sassafras*, L. *Sassafras*. The same tree is indicated by all the colleges, but the Dublin and Edinburgh have adopted the nomenclature of Nees von Esenbeck. It is a native of North America, and belongs to the Natural family *Lauraceæ*, and to the Linnæan class and order *Enneandria Monogynia*.

BOTANICAL CHARACTERS.—A tall straight tree ; with alternate, caducous leaves, of a lucid green colour ; Flowers, diceious, yellow, appearing before the leaves ; Berry succulent, of a rich blue colour.

PREPARATION.—The root is dug up at all periods of the year and cut into billets, in which form it is imported into Britain ; the volatile oil is obtained from it by distillation.

PHYSICAL PROPERTIES.—Sassafras root is imported in various sized, branched, pieces or logs, covered with a reddish-brown bark which is often partially stripped off ; the wood is of a reddish-yellow colour, light and very porous ; it has an aromatic agreeable odour, somewhat resembling fennel, and a warm aromatic taste, both of which are dependant on the presence of volatile oil, which was formerly officinal in the Dublin Pharmacopœia. The odour and taste of the bark are stronger than of the wood. The volatile oil is of a pale yellow colour, and is heavier than water.

CHEMICAL PROPERTIES.—Sassafras wood and bark have been recently analysed by Reinsch ; the latter is much the more active. It contains a peculiar principle which he has named *sassafrid*, and which bears much resemblance to tannic acid, a light and heavy volatile oil, camphoraceous matter, tannin, and other unimportant matters. The medicinal virtues are extracted by both water and alcohol.

THERAPEUTICAL EFFECTS.—A stimulating diaphoretic, but its powers as such are so uncertain that it is never prescribed alone. The wood forms a constituent of the *compound decoction of sarsaparilla*, and of the *decoction of guaiacum*, but the boiling to which these preparations are submitted, by the direction of the London and Edinburgh Colleges, must completely dissipate the volatile oil, the active principle of the sassafras.

DOSE AND MODE OF ADMINISTRATION.—It may be given in the form of infusion, prepared by infusing 3j. of the chips in Oj. of boiling water for an hour, of which f3ij. may be taken three or four times a day.—*Oleum Sassafras*, E. (Prepared according to the general direction for volatile oils). But seldom used, it is an aromatic stimulant in doses of min. ij. to min. x.

CHAPTER VIII.

DIURETICS.

DIURETICS are medicines which augment the secretion and promote the discharge of urine. These effects are produced in a very different manner by different substances; some acting as direct stimulants to the secreting vessels of the kidney, being taken into the current of the circulation and carried without undergoing any decomposition *in transitu* to the urinary organs; others are partially acted on by the digestive organs, and some of their component parts thus eliminated are carried by the circulation to the kidneys, which are thereby stimulated to increased action; while a third class of substances acts primarily on the stomach, the action they excite being secondarily communicated by sympathy to the urinary organs. In whatever manner the action of diuretics is produced, the general effect is to diminish the watery part of the blood, and by this means promote the absorption of fluid effused into any of the cavities or into the areolar membrane. Hence, dropsy is the disease in which they are principally employed, and when the discharge of urine can be excited by their administration, the effused fluid is in general removed more speedily from the system and with less injury to the patient than by any other method. But they are most uncertain in their operation, and it often happens that, although the discharge of urine is much augmented, the dropsical swellings are not removed. The action of diuretics is much modified by the state of the skin, and it therefore frequently occurs that if the surface of the body be excited by external warmth after the administration of a diuretic, its action will be diverted from the kidneys to the vessels of the skin, and diaphoresis will be occasioned. A cathartic action seems also to be, to a certain extent, incompatible with diuresis, and consequently some remedies, as cream of tartar, oil of turpentine, &c., which, if given in small doses properly regulated, increase remarkably the urinary discharge, when administered in larger doses so as to act on the bowels, will occasion scarcely any apparent influence on the functions of the kidneys. The rule has been very generally laid down, and especially by the disciples of the Liebig school of chemists, that when any of the saline diuretics are administered, they should be given in a state of great dilution, on the principle that if the solution in which they are prescribed be not of a lower specific gravity

than the urine, it would fail to produce diuresis. I cannot, however, agree with this assertion, as experience has led me, more particularly in the treatment of dropsies, to place most confidence in diuretic medicines administered, so to say, in rather concentrated solution; a practice I was first led to adopt from considering that saline diuretics, when so administered, require for their elimination by the kidneys a greater amount of the fluids of the system than if they were taken in a diluted state; the demand thus created must be supplied at the expense of the serum of the blood, and the therapeutical action of the medicine is thereby increased. The most important rules to be attended to in the exhibition of the remedies of this class, are to keep the surface of the body cool, and as soon as the action of the diuretic has commenced, to promote its operation by the use of diluent drinks. Diuretic medicines, when applied to the surface of the body in the form of liniment, or concentrated tincture, or infusion, will in some cases act with much certainty even after they have failed to produce diuresis when given by the mouth; this mode of employing them may consequently be often had recourse to with much advantage.

ÆTHEREUS NITROSUS SPIRITUS, D. SPIRITUS ÆTHERIS NITRICI, L. E.—*Nitrous ethereal spirit; Hyponitrous ether with (four volumes of, E.) rectified spirit; Spirit of nitric ether; Sweet spirits of nitre.*

PREPARATION.—*Dublin.*—"Take of rectified spirit, two pints and eight fluid ounces; pure nitric acid, three fluid ounces; water, one ounce; solution of ammonia, a sufficient quantity. Place six ounces of the spirit in a glass matrass capable of holding a quart, and connect this with a Liebig's condenser, whose further extremity is fitted loosely by a collar of tow into a thin eight-ounce phial. Add now the water to the nitric acid, and, having introduced half of the resulting solution into the matrass, through a safety syphon tube, close the mouth of this tube with a cork, and apply for a few moments a gentle heat, so as to cause a commencement of ebullition. When the *action* (which, shortly after commencing, proceeds with much violence, and should be moderated by the external application of cold water) has relaxed, introduce gradually the remainder of the acid, so as to restore it. The action having entirely ceased, agitate the distilled product with half its bulk of the solution of ammonia, allow the mixture to rest for a few minutes, and, having separated the supernatant ethereal liquid, mix four ounces of it with the rest of the spirit, and preserve the product in small, strong, and accurately stopped bottles. In the performance of the preceding distillation, the condenser should be fed with ice-cold water, and the phial, in which the distilled liquid is received, should be surrounded by a mixture of one part salt and two of pounded ice; or, when ice cannot be procured, with a mixture of eight parts of sulphate of soda in small crystals, and five of commercial muriatic acid." *London.*—"Add gradually ℥iv. of nitric acid to ℔iij. of rectified spirit; mix and distil f̄xxxij." *Edinburgh.*—"Rectified spirit, Oj. f̄3vj.; pure nitric acid (D. 1500), f̄3vij.; put f̄3xv. of the spirit with a little clean sand into a two-pint matrass, fitted with a cork, through which are passed a safety tube terminating an inch above the spirit, and another tube leading to a refrigeratory; the safety tube being filled with pure nitric

of *Barosma crenata*, D.—of various species of *Barosma*, E. Leaves of *Diosma crenata*, L. The various species of the genus *Diosma*, or as it has been recently named *Barosma*, from which the buchu of commerce is obtained, are natives of the Cape of Good Hope; and are placed in the Natural family *Rutaceæ*, and in the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Small shrubs, with opposite, smooth, dotted leaves, and stalked axillary flowers; all the species have a heavy odour.

PHYSICAL PROPERTIES.—As it occurs in commerce at present, buchu consists almost entirely of the leaves of *Barosma serratifolia* mixed with a small quantity of the white flowers; but a few years since, as described in the first edition of this book, it was composed of various species, two in particular, *B. crenata* and *B. crenulata*, intermixed with broken stalks and seed vessels. The leaves are smooth and shining, dotted with glands containing essential oil; they are of a pale yellowish-green colour, have a heavy aromatic odour resembling a mixture of rue and peppermint, and an aromatic taste leaving a sense of coldness on the mouth.

CHEMICAL PROPERTIES.—Buchu leaves consist of volatile oil (upon which their medicinal properties chiefly depend), gum, resin, extractive, &c. They yield their virtues to water and to alcohol. The volatile oil is of a yellowish-brown colour, lighter than water, and of the same odour as the leaves; the extractive has been named *Diosmin*.

THERAPEUTICAL EFFECTS.—Buchu is a stimulating diuretic; the volatile oil is taken into the circulation, and it communicates its odour to the urine soon after it has been taken. Independently of its stimulating the kidneys to increased action, it seems to act as a direct tonic to the mucous membrane of the urino-genital organs; thus, it is found most useful in chronic mucous discharges from the bladder and urethra, in diseased prostate, in irritability of the bladder, and in some forms of incontinence of urine. At the Cape of Good Hope the powdered leaves are used as a vulnerary, and a spirit distilled from them is employed in dyspeptic affections.

DOSE AND MODE OF ADMINISTRATION.—In powder, (a bad form), ʒj. to ʒss.—*Infusum Buchu*, D.—*Bucku*, E.—*Diosmæ*, L. (Buchu leaves (bruised, D.), ʒss. (ʒj., L. E.); boiling (distilled, L.) water, Oss. (Oj. L. E.); infuse for one hour (in a covered vessel, D., four hours, L., two hours, E.), and strain “through linen or calico,” E. “The product should measure about eight ounces,” D.). Dose, fʒj. to fʒij.—*Tinctura Buchu*, D. E. (Buchu leaves (bruised, D.), ʒv.; proof spirit, Oij.; macerate for 14 (7 E.) days, (strain, express, D.) and filter. “May be also made quickly and conveniently by percolation,” E.). Dose, fʒj. to fʒiij., in any convenient vehicle.

INCOMPATIBLES.—The sesquialts of iron; and the astringent vegetables.

CAMBOGIA.—The diuretic properties of gamboge have been noticed at page 73, and a formula given for its administration; it is not used in this country as a diuretic, although an excellent purgative in dropsical cases, and when given with that intention I have found it promote the operation of medicines of this class.

CANTHARIS, L. E. CANTHARIS VESICATORIA, D. LYTTA, D.—*Cantharis vesicatoria*, the whole fly; *Cantharides*; *Spanish flies*. This, the *Meloë vesicatorius* of Linnæus, belongs to the class *Insecta*, and to the order *Coleoptora*. It is a native of the middle and southern parts of Europe, and has also been met with, but rarely, in England. It frequents the ash, the privet, the lilac and the honeysuckle, and is also found on the elder, the rose, the plum, the elm and the poplar, upon the leaves of which trees the insect feeds. In the month of June, *Cantharides* are collected in the south of Europe. In the morning, before the rising of the sun, while the insects are still torpid from the moisture of the night, men, whose faces and hands are covered with masks and gloves, having spread a cloth upon the ground, shake the tree violently; the insects fall into the cloth, are immediately gathered in sieves, and are killed by exposure to the vapour of vinegar or preferably by being placed for a short time in an air-tight vessel; they are then dried in stoves. When perfectly dry, *cantharides* are immediately put into air-tight boxes, containing a little sulphate of lime or camphor, the former to keep them dry, and the latter to preserve them from the attacks of mites and other insects by which they are devoured.

PHYSICAL PROPERTIES.—Each *cantharis* is from six to ten lines long, and about a grain and a-half in weight; it has two wing-covers or elytræ, long, flexible, of a golden-green colour; two membranous, transparent wings, inferior, folded; antennæ, black, filiform, longer than the head; and a longitudinal furrow along the head and neck. *Cantharides* have a faint disagreeable odour, and a resinous, very acrid taste. They are readily reduced to powder, which in the finest state presents numberless glistening green particles of the elytræ; this is their most distinguishing characteristic, Orfila having recognized them in the human stomach nine months after interment.

CHEMICAL PROPERTIES.—*Cantharides* consist of a white crystalline substance named *cantharidine*, of a yellow-fat oil, a concrete green oil, a yellow viscid substance, a black substance, osmazome, uric, acetic, and phosphoric acids, and some salts. Its active properties are due to the *cantharidine*, which may be obtained by acting on the powder with rectified spirit, distilling off the spirit and crystallizing; it occurs in the form of white, micaceous scales, is very volatile even at the ordinary temperature, and is very soluble in alcohol, ether, and the fixed and volatile oils, but when pure is insoluble in water. It is a very active poison, and produces immediate inflammation of the skin wherever it comes in contact with it. *Cantha-*

ridine, according to Farines, exists only in the trunk and soft parts of the body of the fly, and the head, antennæ, clytra, wings and legs are inert, or nearly so.

Adulterations.—By the characters given above, cantharides may be distinguished from other insects which resemble them, and are said to be frequently mixed with them on the Continent. They are best protected from the attacks of mites, which destroy their activity, by keeping in well-stoppered bottles and adding a few drops of strong acetic acid (Pereira), or a few grains of camphor, which I have found very effectual. In powder they are not unfrequently adulterated with euphorbium, a fraud which may be easily detected by boiling the suspected powder in a water-bath, with proof-spirit, and filtering while hot; if any euphorbium is present, the decoction on cooling will deposit the gum-resin.

THERAPEUTICAL EFFECTS.—The most important medicinal property of the Spanish fly is its vesicating power, which will be considered hereafter, (See, *Epispastics*). In large doses it is a powerful irritant poison; in small or medicinal doses, it acts as a stimulant to the urino-genital organs, generally causing diuresis and exciting the venereal appetite; but according to Christison, the latter effect is not produced unless it be taken in poisonous doses. As a diuretic, cantharides are not much used in consequence of the dangerous symptoms which sometimes arise even from small doses; those who have employed them state that they prove beneficial in incontinence of urine caused by paralysis of the neck of the bladder, and when it occurs in young persons during sleep. They have also been highly praised by many as a remedy for gleet, leucorrhœa, and chronic mucous discharges from the urinary organs.

DOSE AND MODE OF ADMINISTRATION.—Cantharides are seldom employed internally in the form of powder, the dose is gr. ss. to gr. ij. made into pill with extract of liquorice or conserve of roses.—*Tinctura Cantharidis*, D. L. E. (Cantharides, (in coarse powder, D. bruised, L.), ʒss.; proof spirit, Oij.; macerate for 14 (7 E.) days, strain, express and filter. "This tincture may be obtained more conveniently and expeditiously by percolation, provided the cantharides be reduced to coarse powder, and left with a little of the spirit in the state of pulp for 12 hours before the process of percolation is commenced," E.). Dose, min. x. gradually increased to min. xl.; it should be given in at least an ounce of some emulsion, or of decoction of linseed or barley.

In cases of poisoning with cantharides, we are not acquainted with any antidote; but emetics, emollient and mucilaginous drinks, blood-letting general and local, opiates by the mouth and rectum, and general antiphlogistic treatment should be resorted to.

DIGITALIS PURPUREA, D. *DIGITALIS FOLIA ET SEMINA*, L. *DIGITALIS*, E.—*The leaves (and seeds, L.) of Digitalis purpurea.* Fox-

glove. An indigenous, biennial plant; belonging to the Natural family *Scrophulariaceæ*, and to the Linnæan class and order *Didymia Angiospermia*.

BOTANICAL CHARACTERS.—Stem erect, three to four feet high, with a purplish hue; Leaves, large, veiny, ovato-lanceolate, crenate, downy, purplish on their under surface; Flowers, numerous, purple, spotted within, drooping, in very long spikes.

PREPARATION.—The leaves are gathered in the months of June and July, just before the plant comes into flower, and the mid-rib and stalk removed; they are dried with stove heat, in a dark place. The seeds are gathered when fully ripe, they are very seldom employed.

PHYSICAL PROPERTIES.—The dried leaves of *digitalis* when properly preserved, are of a bright green colour, they have scarcely any odour, but the taste is nauseous and acrid.

CHEMICAL PROPERTIES.—They consist of volatile oil, a concrete flocculent volatile matter, fatty matter, extractive, tannin, &c., and a peculiar principle recently discovered by M. M. Homolle and Quevenne, and named by them *digitaline*, which will be described in the chapter on *Sedatives*. The leaves yield their active properties to water, alcohol, ether, and the weak acids. The sesqui-salts of iron produce a dark, and solution of gelatin a white flaky precipitate with infusion of *digitalis*, indicating the presence of tannin.

Adulterations.—The leaves of several species of *Verbascum* are often offered for sale for those of *digitalis*; the botanical characters should therefore be attended to. The powder should be of a fine green colour, and possess the acrid taste of the fresh plant.

THERAPEUTICAL EFFECTS.—*Digitalis*, in small doses gradually augmented, operates as a special stimulant to the kidneys, increasing the secretion of urine; in somewhat larger doses, or when its use is continued for a longer period, it acts as a *sedative* to the vascular system, (See, *Sedatives*). As a diuretic in the various forms of dropsy, *digitalis* has acquired a high reputation, but later experience has shown that it proves most serviceable in those symptomatic dropsical effusions which take place into the areolar membrane of the extremities and of the face, and which depend on diseases of the heart, of the kidneys, or of the liver. It is also better adapted as a diuretic for persons of a weak or enfeebled habit of body, than for the strong or the robust; and should any inflammatory symptoms be present, antiphlogistic treatment should be had recourse to before employing *digitalis*. The diuretic action of foxglove is much promoted by combining it with other remedies of this class, as squill, juniper, the diuretic salts of potash, &c., or with small doses of calomel; when there is much debility present, preparations of iron are advantageously prescribed in conjunction with it.

DOSE AND MODE OF ADMINISTRATION.—Of the powder gr. ss. every six hours, its operation being aided by the use of diluents, and the surface of the body being kept cool; administered thus, it generally produces a copious flow of urine after the fifth or sixth dose.—*Infusum Digitalis*, D. L. E. (*Digitalis*, dried, ʒi. (ʒij. E.);

(spirit of cinnamon, f3j. L. f3ij. E.); boiling (distilled L.) water, 3ix. (Oj. L. f3xviij. E.); “infuse for one hour in a covered vessel and strain. The product should measure about f3viij.,” D.; “digest for 4 hours in a covered vessel, strain (through linen or calico, E.); and add the spirit, L. E.”). This is the best preparation of digitalis; the dose is f3ij. to f3ss., every six hours. The infusion prepared with double the quantity of digitalis, and applied to the surface of the abdomen in ascites, or to the legs in anasarca, by means of spongopiline or flannel covered with oil-silk, will, in many cases, produce a diuretic action, when the medicine administered by the mouth has failed to do so.—*Tinctura Digitalis*, D. L. E. (Digitalis, dried (and coarsely powdered, D., in moderately fine powder, E.), 3v. (3iv. L. E.); proof spirit, Oij.; macerate for 14, (7 E.) days and strain, (strain, express, and filter, D.) “Best prepared by percolation, as directed for tincture of capsicum: if f3xl. of spirit be passed through, the density is .944, and the solid contents of a fluid ounce amount to gr. xxiv.” E). This tincture, if well prepared, has a greenish colour when viewed by transmitted light. Dose, min. xx., three times a day; it may be given in f3j. of decoction of broom-tops, combined with sweet spirits of nitre, and compound spirit of juniper.—*Pilulæ Digitalis et Scillæ*, E. (Digitalis; and squill, of each, one part; aromatic electuary, two parts; beat into a proper mass with conserve of red roses, and divide into four-grain pills). An excellent diuretic pill; Dose, one pill every five or six hours.

INCOMPATIBLES.—Sulphate, and tincture of the muriate, of iron; the preparations of cinchona bark; and the acetates of lead.

JUNIPERUS COMMUNIS, CACUMINA FRUCTUS (BACCÆ, D.), ET OLEUM, D. L. E.—*The tops, the fruit, and the volatile oil of the fruit of Juniperus communis; Common Juniper.* Indigenous; belonging to the Natural family *Coniferae* (*Pinaceæ*, Lindley), and to the Linnean class and order *Diacia Polyandria*.

BOTANICAL CHARACTERS.—A bushy shrub from two to eight feet high, evergreen; Leaves, linear, mucronate; Flowers appearing in May, axillary, small; Fruit, a berry (*galbulus*), three-seeded, requiring two seasons to arrive at maturity.

PREPARATION.—The tops are cut in spring before the plant flowers, and the berries are gathered when ripe, both are dried with stove heat; the oil is obtained from the berries by simple distillation.

PHYSICAL PROPERTIES.—*Juniper berries* are spherical, somewhat larger than a pea, of a bluish-black colour; they have a strong aromatic, terebinthinate odour, and a sweetish, pungent, terebinthinate taste. They are imported from Hamburgh and from several of the Mediterranean ports.—*Juniper tops* have a similar odour and taste, but both much weaker.—*Juniper oil* is limpid, transparent, lighter than water, and of a very pale greenish colour. It has the peculiar odour and taste of the berries in a marked degree. Its composition

is $C^{10}H^8$ being isomeric with oil of turpentine, and its specific gravity, .911.

CHEMICAL PROPERTIES.—The medical properties of juniper are due to the volatile oil; the berries contain besides, resin, sugar, gum, wax, and some salts of lime. The tops and berries yield their active principles to boiling water and to alcohol.

THERAPEUTICAL EFFECTS.—Juniper is a stimulating diuretic, promoting the secretion of urine to which it communicates its peculiar odour. It is chiefly used as an adjunct to other diuretics in dropsical affections; its use is contraindicated if the kidney be diseased, or if any inflammatory symptoms be present.

DOSE AND MODE OF ADMINISTRATION.—The berries are best prescribed in the form of infusion:—*Infusum Juniperi*, D. (Take of Juniper berries, bruised, one ounce; boiling water, half a pint: infuse for one hour, in a covered vessel, and strain. The product should measure about eight ounces). Dose, $\text{f}\text{3ij.}$ to $\text{f}\text{3iij.}$, three or four times a day: the tops are at present scarcely ever employed.—*Spiritus Juniperi compositus*, D. L. E. (“Take of Juniper berries, bruised, eight ounces; caraway seed, bruised; fennel seed, bruised, of each, one ounce; proof spirit, half a gallon; water, one pint: macerate the berries and the seeds in the spirit, for twenty-four hours; then add the water, and with a slow fire distil off half a gallon,” D.—“Juniper berries, bruised, lbj. (3xv. L.); caraway, bruised; and fennel, bruised, of each, 3iss. (3ij. L.); proof spirit, cong. j. (Ovij. E.); water sufficient to prevent empyreuma, Oij. “macerate for 48 hours, add the water, and distil Ovij. ” E. “Mix and distil a gallon with a slow fire,” L.). A powerful diuretic, introduced into the pharmacopœias as a substitute for *Geneva*. Dose, $\text{f}\text{3ij.}$ to $\text{f}\text{3iv.}$ Generally used as an adjunct to stimulating diuretic mixtures.”—*Oleum Juniperi*. (Obtained from the berries according to the general process for obtaining volatile oils*). Dose, min. ij. to min. v. as an oleosaccharum or dissolved in spirit. It is to the presence of this oil that the spirit called *Geneva* or *Hollands* owes its peculiar flavour and the diuretic properties it possesses.

* The following general directions for obtaining volatile oils are given in the three British pharmacopœias; they are introduced here as it is the first instance in which a volatile oil, thus prepared, has come under consideration:—*Dublin.*—“The substance from which the oil is to be extracted is macerated for twenty-four hours, with five times its weight of water, in a sheet-tin or copper still, and, a condenser being then attached, half the water is drawn over by distillation, on the surface of which the oil will be found to float, unless (which is rarely the case) it should be heavier than water, when it will be found at the bottom of the receiver. The oil having been separated, the aqueous product, which is a saturated solution of the oil in water, is to be returned to the still, and the distillation resumed, and continued till the resulting liquid has the same volume as before. The oil is again separated, the watery product returned to the still, and the distillation resumed; and this process is to be repeated until it ceases to afford any additional oily product. The oil thus obtained is to be separated as completely as possible from water, and preserved in a well-stopped bottle. The water distilled over in the preparation of the several oils should be preserved for medical use.” *London.*—“Put the part of the plant directed into an alembic, and add as much water as is sufficient to cover it, then let the oil distil into a large cold vessel.” *Edinburgh.*—“Volatile oils are obtained chiefly from the flowers, leaves, fruits, barks, and roots of plants, by distilling them with water, in which they have been allowed to macerate for some time. In order to

PAREIRA, D. L. E. *Root of Cissampelos Pareira* ; *Pareira-brava* ; *Velvet Leaf*. This plant is an inhabitant of the West Indian isles and of the South American Main ; it belongs to the Natural family *Menispermaceæ*, and to the Linnæan class and order *Diacia Monadelphica*. According to Aublet, Pareira brava is the root of *Abuta rufescens*, the *Cocculus platiphylla* of St. Hilaire ; a plant which also belongs to this family.

BOTANICAL CHARACTERS.—A climbing shrub, with a woody branching root ; leaves, smooth, silky beneath ; Flowers, small, yellow ; berries, scarlet, roundish, hispid.

PHYSICAL PROPERTIES.—Pareira root is imported in cylindrical pieces, from half an inch to three inches in diameter, and from five or six inches to three or four feet in length. It is covered externally with a dark-brown cortex, which is thin and firmly adherent ; internally the wood is very porous, of a pale reddish-yellow colour. It is odourless, but has a sweetish, aromatic, intensely bitter taste.

CHEMICAL PROPERTIES.—It consists of a soft resin, bitter extractive (*cissampelin*) on which its activity depends, fecula, nitrate of potash and other salts, colouring matter, lignin, &c. It yields its virtues to both cold and boiling water.

THERAPEUTICAL EFFECTS.—Pareira is a tonic diuretic, acting specifically on the urinary organs, increasing their secretion, and at the same time checking discharges from the mucuous membrane of the bladder and urethra. It is with the latter intention only that it is ever employed at present ; and according to the observations of Sir Benjamin Brodie, it has a great influence over the ropy mucous discharge of chronic inflammation of the bladder.

DOSE AND MODE OF ADMINISTRATION.—In powder, a bad form,

obtain these oils profitably, and of good quality, a great variety of conditions must be attended to, differing in regard to each, and such as it would be out of place to enumerate here in detail. Certain general principles, however, may be mentioned. Flowers, leaves, and fruits generally yield the finest oils, and in greatest quantity, when they are used fresh. Many, however, answer equally well, if they have been preserved by beating them into a pulp with about twice their weight of muriate of soda, and keeping the mixture in well-closed vessels. Substances yielding volatile oils must be distilled with water, the proper proportion of which varies for each article, and for the several qualities of each. In all instances, the quantity must be such as to prevent any of the material from being empyreumatized before the whole oil is carried over. In operations where the material is of pulpy consistence, other contrivances must be resorted to for the same purpose. These chiefly consist of particular modes of applying heat, so as to maintain a regulated temperature not much above 212°. On a small scale heat may be thus conveniently applied by means of a bath of a strong solution of muriate of lime, or by means of an oil-bath, kept at a stationary temperature with the aid of a thermometer. On the large scale, heat is often applied by means of steam, under regulated pressure. In other operations it is found sufficient to hang the material within the still in a cage or bag of fine net-work ; and sometimes the material is not mingled with the water at all, but is subjected to a current of steam passing through it. The best mode of collecting the oil is by means of a refrigeratory, from which the water and oil drop together into a tall narrow vessel provided with a lateral tube or lip near the top, and another tube rising from the bottom to about a quarter of an inch below the level of the former. It is evident, that with a receiver of this construction the water will escape by the lower tube ; while the volatile oil, as it accumulates, will be discharged by the upper one, except in the very few instances where the oil is heavier than water."

3ss. to 3j.—*Extractum Pareiræ*, L. E. (“Pareira, bruised, ℞iiss.; boiling distilled water, cong. ij.; macerate for 24 hours, then boil down to cong j. and strain the liquor while yet hot; lastly, evaporate to a proper consistence,” L. “Prepared as extract of Gentian,” E.). Dose, gr. x. to 3ss., generally given as an adjunct to the infusion.—*Infusum Pareiræ*, D. L. E. (“Take of Pareira root, bruised and torn into shreds, half an ounce; boiling water, nine ounces: digest for one hour, in a covered vessel, and strain. The product should measure about eight ounces.” D.—“Pareira, 3vj.; boiling (distilled, L.) water, Oj.; macerate for two hours in a lightly covered vessel, and strain, (through linen or calico, E.)” L. E.) The preparation of the London and Edinburgh Pharmacopœia is much too weak. Dose, f3j. to f3iv., three or four times a day. Christison recommends the infusion to be prepared with cold water and by the process of percolation, but boiling water more completely extracts the bitter principle.—*Decoctum Pareiræ*, BRODIE. (Pareira, 3ss.; boiling water, Oij.; boil down to Oj., with a gentle heat). Dose, f3j. to f3ij. three or four times a day. This is the preparation in most general use.

INCOMPATIBLES.—The sequi-salts of iron; the acetates of lead; and tincture of iodine.

POTASSÆ ACETAS. *Acetate of Potash*, (described in the division (*Cathartics*), dissolved in a large quantity of water and given in small doses frequently repeated, operates as a mild but certain diuretic. It is employed most generally as an adjunct to other remedies of this class, in ascites and hydrothorax. It has been recently very highly recommended for the treatment of psoriasis, lepra, and eczema, by Dr. Easton, of Glasgow, in doses of half a drachm three times a day, dissolved in an ounce of water. Dose, as a diuretic, gr. x. to gr. xx., it is best administered in decoction of broom tops, or of Pyrola.

POTASSÆ BITARTRAS. *Bitartrate of Potash* (described in the division *Cathartics*), when administered in small doses dissolved in a large quantity of water, or in combination with other diuretics, increases the secretion of urine remarkably, and consequently is very generally employed in all forms of dropsy. Dose, as a diuretic, gr. xx. to 3j., frequently repeated.—*Imperial*, an excellent diuretic and refrigerant drink in febrile diseases, is prepared by dissolving 3j. or 3ij., of bitartrate of potash in Oj. of boiling water, and flavouring with lemon-peel and sugar.—*Cream of tartar whey* used for the same purposes, is prepared by boiling 3iss. of the bitartrate in Oj. of new milk, and straining to remove the curd. Either of these drinks may be taken *ad libitum*.

POTASSÆ NITRAS, D. L. E. NITRUM, D. *Nitrate of Potash ; Nitre ; Saltpetre ; Sal-prunelle.*

PREPARATION.—Nitrate of potash is an article of the *Materia Medica* ; it is imported into Britain chiefly from the East Indies, where it is obtained by lixiviating the surface of the soil of certain districts, dissolving out with water the saline matters contained therein, filtering and crystallizing ; after importation, the salt is purified by solution and recrystallization. The *Dublin College* directs the commercial salt to be further purified by the following process when it constitutes the *Potassæ nitras purum* :—“ Take of commercial nitre, four pounds ; distilled water, five pints, or a sufficient quantity : having dissolved the nitre in two pints of the water at a boiling temperature, let the heat be withdrawn, and the solution be stirred constantly as it cools, in order that the salt may be obtained in very minute crystals. These, deprived as much as possible of the uncrystallized solution by decantation and draining, are to be washed in a glass or earthenware percolator with the remainder of the water, or until the liquid which trickles through ceases to give a precipitate when dropped into a solution of nitrate of silver. The contents of the percolator should now be extracted, and dried in an oven.”

PHYSICAL PROPERTIES.—A solid colourless salt, in striated prismatic crystals generally six-sided, with dihedral summits, semitransparent, inodorous, having a cooling, saline, slightly bitter taste. Specific gravity, 1.933.

CHEMICAL PROPERTIES.—It is composed of one equivalent of potassa, and one of nitric acid, (KO, NO^5), is anhydrous, permanent in the air, fusible by a heat below redness into a limpid liquid, in which state, when cast in moulds, it forms *sal-prunelle* ; by a strong heat it is decomposed into oxygen, and hyponitrite of potash. Nitre is soluble in four parts of water at 60° , and in about half its weight of boiling water ; during the solution cold is generated ; it is insoluble in absolute alcohol.

Adulterations.—Nitrate of potash, as met with in commerce, is often contaminated with sulphate of potash or chloride of potassium ; the presence of the former is detected by solution of hydrochlorate or nitrate of baryta, that of the latter, by solution of nitrate of silver, causing white precipitates, in a solution of the salt in distilled water.

THERAPEUTICAL EFFECTS.—In large doses, from 3vj. to 3ij. , nitre acts as an irritant to the gastro-intestinal mucous membrane, producing generally nausea, vomiting, purging, and even death. In small doses, gr. xxx. to gr. xl. , it increases the flow of urine, in which secretion it can be detected soon after it has been swallowed. It is generally employed as an adjunct to the vegetable diuretics in anasarca and ascites, but it is inadmissible in cases where there is any tendency to irritation or inflammation of the digestive tube. Nitrate of potash is greatly inferior as a diuretic to the acetate or bitartrate, and in the present day is, consequently, more employed for its refrigerant properties. (See, *Refrigerants.*).

INCOMPATIBLES.—Sulphuric acid ; alum ; sulphate of magnesia ; metallic sulphates ; and hydrochloric acid if heat be applied.

PYROLA, D. E. CHIMAPHILA, L.—*Herb of Chimaphila umbellata*, D. E.—*of Chimaphila corymbosa*, L.—*Umbelled Winter-green*; *Pyrola*; *Pipsissewa*. This plant is a native of North America, but is also found in the woods of Europe and Asia. It belongs to the Natural family *Pyrolaceæ*, and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL CHARACTERS.—A small perennial under-shrub; with evergreen, cuneato-lanceolate leaves, coriaceous, smooth and shining; Flowers in a small corymb, reddish-white, fragrant.

PHYSICAL PROPERTIES.—Although the entire herb is indicated by the colleges, the leaves only are generally employed. In the fresh state when bruised they have a strong unpleasant smell, but in the dry state they are odourless; they have a bitter-sweet, astringent, slightly aromatic taste. If applied to the skin when recently gathered, they act as slight vesicatories.

CHEMICAL PROPERTIES.—They contain, bitter extractive, resin, tannin, &c.; the medicinal virtues probably depend on the combination of these three substances, they are communicated to boiling water by infusion, but more completely by decoction.

THERAPEUTICAL EFFECTS.—Pyrola leaves operate as a tonic diuretic, exerting a specific influence on the urinary organs, increasing the secretion of urine, and according to many observers, diminishing the secretion of lithates. They have been chiefly used in dropsies occurring in the old and debilitated, and in chronic mucous discharges from the bladder and urethra. In the advanced stages of *albuminuria* where diuretics are sometimes called for, I have administered the decoction of this herb with excellent effect.

DOSE AND MODE OF ADMINISTRATION.—Never given in powder. *Decoctum Pyrolæ*, D.—*Chimaphilæ*, L. ("Take of leaves of winter-green, dried, half an ounce; water, half a pint: boil for ten minutes, in a covered vessel, and strain. The product should measure about eight ounces," D.—"Pyrola, ʒj.; distilled water, Oiss.; boil down to a pint and strain," L.). Dose, fʒj. to fʒij. three or four times a day. An extract may be prepared by evaporating the decoction to a proper consistence; it is not used in this country, but is much employed in America in doses of from gr. v. to gr. xv.

INCOMPATIBLES.—The sesqui-salts of iron; and all substances incompatible with tannin

SCILLA, D. L. E. *The bulb of Urginea Scilla*, D.—*of Scilla maritima*, L.—*of Squilla maritima*, E. *Squill*. A native of the shores of the Mediterranean, of France, and of Portugal; belonging to the Natural family *Liliaceæ*, and to the Linnæan class and order *Hexandria Monogynia*.

BOTANICAL CHARACTERS.—Bulb, very large, sending up annually a scape or flowering stem from two to three feet high, terminated by a dense long raceme of white

flowers; the leaves, which appear after the flowers, are broadly lanceolate, 12 to 18 inches long.

PREPARATION.—The bulb, which is the officinal part of the plant, is dug up in autumn, divided into four parts, the centre cut out and rejected as being inert, and the remainder cut into thin slices, which are dried quickly with a gentle heat. Sometimes, however, the bulb is imported entire. Squill is brought from Malta, and other Mediterranean ports; also from St. Petersburg and Copenhagen.

PHYSICAL PROPERTIES.—The entire bulb varies in size from that of the fist to that of a child's head, ovoid, covered externally with layers of thin, reddish (*squilla rubra*), or whitish (*squilla alba*), papery membranes; internally, it is composed of thick, fleshy, concentric scales, of a pale rose-colour. Dried squill is in yellowish, somewhat translucent slices, brittle, but readily attracting moisture, when they become flexible; it is odourless, but has an acrid, very nauseous taste.

CHEMICAL PROPERTIES.—Squill consists of a crystallizable alkaloid, *Scillitina*, probably the active principle of the drug, of tannin, gum, a fatty matter, uncrystallizable sugar, acrid volatile matter, and some salts. It yields its virtues to water, alcohol, vinegar, and the dilute acids. The sesqui-salts of iron communicate a deep blue colour to the infusion, but it is not affected by gelatin, or by tincture of iodine.

THERAPEUTICAL EFFECTS.—In large doses squill acts as a narcotico-acrid poison, twenty-four grains of the powder having proved fatal. In medicinal doses it operates as an emetic, expectorant, and diuretic; for the latter purpose it is usually given in combination with digitalis and calomel, when it seldom fails to produce increased flow of urine, and at the same time promote the absorption of the effused fluid in dropsies. Squill is better adapted for local than for general dropsy, it is generally held to be inadmissible when inflammatory symptoms are present. (See, *Emetics* and *Expectorants*.)

DOSE AND MODE OF ADMINISTRATION.—To reduce squill to powder the slices should be carefully dried at a temperature not exceeding 100° F., and immediately triturated in a dry, warm mortar. The powder should be kept in close-fitting glass-stoppered bottles, in a warm place, as it attracts moisture rapidly from the air. Dose, as a *diuretic*, gr. j. to gr. iij., usually given in the form of pill made with conserve of roses or some soft extract.—*Tinctura Scillæ*, D. L. E. (Squill, (in coarse powder, D. E.), \bar{z} v.; proof spirit, Oij.; macerate for 14 days, “strain, express, and filter,” D. “strain,” L.; “prepare by percolation as for tincture of cinchona, but without packing the pulp firmly in the percolator; it may likewise be prepared by digestion with the sliced bulb,” E.). Dose, min. x. to min. xxx. An excellent addition to infusion of digitalis, or decoction of broom-tops.—*Acetum Scillæ*, D. L. E. (“Take of squill, dried and bruised, two ounces; acetic acid of commerce (specific gravity, 1044), four fluid ounces; distilled water, twelve ounces: in the acid, diluted with the water, macerate the squill in a close vessel, for seven days; then strain with expression, and filter,” D.—“Squill, fresh dried (and

small fragments, E.), ℥xv. (℥v. , E.); distilled vinegar, Ovj. (Oij. , E.); proof spirit, Oss. , (f℥ij. , E.); macerate the squill (with a gentle heat, L.) with the vinegar for 7 days (24 hours, L.) in a covered glass vessel: express the liquor, and as soon as the feces have subsided, pour off and add the spirit," L. E.). Dose, f℥ss. to f℥iss. in some aromatic or distilled water.—*Vinum Scillæ*, (Squill, 30 parts; white wine, 500 parts; macerate for 14 days, and filter). Dose, f℥j. to f℥ij. .

INCOMPATIBLES.—The alkalies; and the sesqui-salts of iron.

SCOPARIUM, D. E. SCOPARIUS, L. *The (fresh, L.) tops (top-branches, D.) of Cytisus scoparius. Broom tops.* The common-broom is an indigenous shrub; belonging to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Diadelphia Decandria*.

BOTANICAL CHARACTERS.—A bushy shrub from three to six feet high; with long, straight, green branches; and large, bright yellow, papilionaceous flowers.

PHYSICAL PROPERTIES.—The fresh green tops, the only officinal part, have a peculiar odour when bruised, and a bitter somewhat nauseous taste.

CHEMICAL PROPERTIES.—Broom-tops, according to Reinsch's analysis, contain a concrete oil, a volatile oil, mucilage, albumen, gluten, and a neutral crystalline principle of intense bitterness, on which and the volatile oil it is probable that its medicinal virtues depend; they are extracted by boiling water.

THERAPEUTICAL EFFECTS.—In the form of infusion or decoction, broom-tops are an excellent and certain diuretic, seldom failing to produce a copious secretion of urine. The officinal preparations of broom-tops are most generally employed as vehicles for the more active remedies of this class in the treatment of dropsical effusions.

DOSE AND MODE OF ADMINISTRATION.—*Infusum Scoparii*, L. (Broom-tops, ℥j. ; boiling distilled water, Oj. ; macerate for four hours in a vessel lightly covered, and strain). Dose, f℥j. to f℥ij. . A bad preparation, much inferior to the decoction.—*Decoctum Scoparii*, D. E. ("Take of broom-tops, dried, half an ounce; water, half a pint: boil for ten minutes, in a covered vessel, and strain. The product should measure about eight ounces," D.—"Broom-tops; and juniper tops, of each, ℥ss. ; bitartrate of potash, ℥ij. ; water, Oiss. ; boil down to a pint and strain," E.).—*Decoctum Scoparii compositum*, L. (Broom-tops; juniper berries; and dandelion, of each, ℥ss. ; distilled water, Oiss. ; boil down to a pint and strain). Excellent diuretics, particularly the two latter, which scarcely ever fail to act on the kidneys. Dose, f℥j. to f℥iv. three or four times a day.

SODÆ ACETAS, D. L.—*Acetate of Soda.*

PREPARATION.—*Dublin*.—"Take of crystallized carbonate of soda of commerce, one

pound, or a sufficient quantity; acetic acid of commerce (specific gravity, 1044), one pint: to the acid, placed in a porcelain capsule, add by degrees the carbonate of soda, and, taking care that there shall be a slight excess of acid, evaporate the resulting solution till a pellicle begins to form on its surface, and set it by to crystallize. The crystals, when drained of the mother liquor, and dried by a short exposure to air on a porous brick, should be enclosed in a well-stopped bottle." An article of the *Materia Medica* of the London Pharmacopœia.

PHYSICAL PROPERTIES.—In white, striated, prismatic crystals, of the oblique rhombic series. It has a faint acetous odour when moistened, and a sharp, cooling, saline taste.

CHEMICAL PROPERTIES.—It consists of one equivalent of soda, one of acetic acid, and six of water of crystallization, (Na O , $\text{C}^4\text{H}^3\text{O}^3$, + 6HO). It is unalterable in ordinary states of the air, but in dry warm air effloresces slightly; it is soluble in three parts of water at 60° , and in somewhat less than its own weight of boiling water; it is also soluble in five times its weight of alcohol. Exposed to heat it undergoes the watery fusion, loses all its water of crystallization at the heat of 550° , and at a heat of 600° it is decomposed.

THERAPEUTICAL EFFECTS.—A mild diuretic, similar in operation to acetate of potash, over which it does not possess any advantage, but for which it may be substituted. It is very rarely used in the present day.

DOSE AND MODE OF ADMINISTRATION, AND INCOMPATIBLES.—Same as acetate of potash.

SODÆ BIBORAS. *Borax* (described in the division *Astringents*), is an excellent diuretic in cases of uric acid gravel, as a solution of it dissolves that acid freely, and does not produce any injurious constitutional effect, even when its use has been continued for some time. It should not be administered to pregnant females, as it stimulates the uterus and has in some instances caused abortion.

TEREBINTHINÆ OLEUM. *Oil of turpentine* (described in the division *Anthelmintics*), given in small doses frequently repeated acts as a stimulant to the renal vessels, causing an increased flow of urine to which it communicates a violet odour. It also possesses a specific action over the mucous membrane of the bladder and urethra, checking excessive discharges, and giving increased tonicity to the vessels which secrete the mucus. If the use of oil of turpentine be too long continued, it is apt to produce strangury, bloody urine, and even sometimes total suppression of the secretion. The dose of oil of turpentine as a diuretic is from min. x. to min. xxx. It has occasionally proved serviceable in dropsical effusions, but its stimulating property forbids its employment if there is any tendency to inflammatory action. It is frequently employed with much benefit in gleet, in leucorrhœa, and in chronic cystorrhœa. Under the use of oil of turpentine, the quantity of lithic acid in the urine is much increased,

owing to which it frequently proves very beneficial in chronic rheumatism and in sciatica, occurring in the old and debilitated.

TEREBINTHINA CHIA, L. E. *Liquid resin of Pistacia terebinthus. Chian turpentine; Scio turpentine.* This tree is a native of parts of the South of Europe, of the Grecian Archipelago, and of Syria; it belongs to the Natural family *Anacardiaceæ*, and to the Linnæan class and order *Diœcia Pentandria*.

BOTANICAL CHARACTERS.—Stem, 30 to 35 feet high; Leaves, pinnate, young leaves reddish; Flowers in compound racemes; Fruit, globular, purplish, inclosing an osseous, one-seeded nut.

PREPARATION.—The liquid resinous exudation, which constitutes the Chian turpentine of commerce, is obtained chiefly in the island of Scio, by making incisions into the trunk of the tree, and allowing the juice which flows out to harden on large flat stones placed under the trees; each tree yields from 8 to 10 ounces only.

PHYSICAL PROPERTIES.—It is of the consistence of very thick honey, but often nearly solid; of a pale greenish-yellow colour; has a weak terebinthinate, somewhat fragrant odour, and a slightly bitter taste.

CHEMICAL PROPERTIES.—Chian turpentine consists of volatile oil, and resin; it resinifies by keeping, or by exposure to the air when it loses its fragrantcy. This turpentine is very scarce, Strasburgh or Venice turpentine being usually substituted for it.

THERAPEUTICAL EFFECTS.—It resembles oil of turpentine, in its action on the urinary organs; but by many it is supposed to act more effectually in checking chronic mucous discharges.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to. gr. xxx. three or four times a day; it may be made into pills with powdered liquorice root, or gum arabic, or it may be given in emulsion with yolk of egg or mucilage.

TEREBINTHINA CANADENSIS, L. BALSAMUM CANADENSE, E. *Canada-balsam; Liquid resin of Pinus balsamea, L.—of Abies balsamea, E.* A native of the coldest regions of North America; belonging to the Natural family *Coniferae* (*Pinaceæ*, Lindley), and to the Linnæan class and order *Monœcia Monadelphica*.

BOTANICAL CHARACTERS.—An elegant tree; Stem about 40 feet high; Leaves, solitary, flat, sub-erect above; Cones, erect on the branches, large, nearly cylindrical, of a beautiful, deep glossy purple colour, fragrant as well as the leaves.

PREPARATION.—The resinous exudation improperly termed balsam is obtained either from little vesicles which form on the bark, or by making incisions quite through the bark into the wood, and collecting the juice as it exudes.

PHYSICAL PROPERTIES.—When fresh it is of the consistence of honey, but it gradually concretes into a yellow, translucent, resinous looking mass; of a peculiar agreeable, terebinthinate odour, and an acrid, rather nauseous taste.

CHEMICAL PROPERTIES.—It consists of volatile oil, two resins one soluble the other insoluble in alcohol, extractive, and some salts. It is insoluble in water, but forms an emulsion with it by means of mucilage or yolk of egg.

THERAPEUTICAL EFFECTS.—The action of Canada turpentine on the urinary organs is similar to that of the other turpentine; it is more generally preferred for the treatment of the advanced stages of gonorrhœa, of gleet, of leucorrhœa, and of cystirrhœa, in which diseases it proves highly beneficial.

DOSE AND MODE OF ADMINISTRATION.—Similar to the last.

UREA. *A peculiar principle contained in the urine of many animals.*

PREPARATION.—By evaporating fresh human urine to the consistence of a syrup, treating with nitric acid, washing well with distilled water the nitrate of urea, decomposing with carbonate of potassa, dissolving the precipitated urea in alcohol and crystallizing. By the following elegant process of Liebig, $\frac{3}{4}$ iv. of perfectly colourless, crystallized urea may be procured from lbj. of ferrocyanate of potash :—"Mix together 28 parts of perfectly dry ferrocyanate of potash with 14 of oxide of manganese, both in fine powder; place the mixture upon a smooth iron plate, and expose it to a dull red heat over a charcoal fire. By and by it will begin to burn of itself, when it is to be frequently stirred about. After it cools it is to be lixiviated with cold water. The solution is to be treated with $20\frac{1}{2}$ parts of dry sulphate of ammonia, whereupon a copious deposit of sulphate of potash will ensue. It is then to be allowed to stand for some time in a warm place (under 212° F.), so as to concentrate the supernatant liquor, which is afterwards to be decanted, treated with alcohol of a density of $\cdot 835$ to $\cdot 865$ and crystallized."

PHYSICAL PROPERTIES.—It occurs in long, colourless, transparent crystals, which are flattened four-sided prisms. They are heavier than water, have a cooling sharp taste, but are inodorous.

CHEMICAL PROPERTIES.—It consists of two equivalents of carbon, two of oxygen, four of hydrogen and two of nitrogen ($C^2O^2H^4N^2$). It is soluble in its own weight of water at 60° , in 4 or 5 parts of cold alcohol, and in 2 parts of boiling alcohol. It is unalterable in dry air, but deliquesces in damp air; it fuses at 248° , and is decomposed at a higher temperature. It is a feeble base combining with most acids without neutralizing them.

THERAPEUTICAL EFFECTS.—Urea is at present scarcely ever employed as a diuretic, although from the reports of several French practitioners, it appears to promote remarkably the secretion of urine, without producing any general disturbance of the animal economy.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xx. dissolved in sweetened distilled water. It may also be given made into pill or bolus, with any soft extract, or with honey, or treacle.

CHAPTER IX.

EMETICS.

(Vomits).

EMETICS are substances which are used for the purpose of producing vomiting. The number of medicines employed with this intention is but few, and they act either *specifically*, that is, they excite vomiting when injected into the veins, as well as when introduced into the stomach, or their operation is *topical*, producing vomiting only when taken into the stomach. Tartar emetic is an example of a *specific*, mustard of a *topical* emetic. It would be out of place here to enter into any consideration of the phenomena and pathology of vomiting; it must suffice to say, that independently of the mere evacuation of the contents of the stomach, emetics in general influence sympathetically the entire system. The primary effect of most emetics is the production of nausea, during which there is general relaxation of the entire muscular system, with a marked diminution in the force of the circulation; by the administration of remedies of this class in doses not quite sufficient to cause vomiting, this effect may be produced with much certainty, and is frequently had recourse to as a therapeutical agent in cases in which it is required to allay spasms or to subdue commencing inflammation. The act of vomiting, on the other hand, excites the circulation, increases the frequency of the pulse, and, determining to the surface of the body, promotes cuticular transpiration; the urinary secretion also is frequently augmented during the operation of an emetic, and the liver stimulated to an increased discharge of bile. Emetics are, therefore, often administered with the view of producing a general *perturbation* of the system, so as to cut short fevers and other severe diseases at their very commencement, and frequently with the best results. In prescribing emetics, attention must be paid to the differences which exist in their mode of operation; some medicines of this class, as sulphate of zinc and sulphate of copper, produce their effects very rapidly, exciting vomiting almost immediately after they are swallowed, without occasioning much nausea or depression. Tartar emetic operates more slowly, and produces great nausea, accompanied by a feeling of feebleness and exhaustion; while the vegetable emetics, as ipecacuanha and squill, require a much longer time for their operation. In selecting a particular remedy of this class, therefore, we should be always guided by the nature of the indication which is to be fulfilled.

Emetics should be employed with great caution, where there are symptoms of determination of blood to the cerebral organs, in consequence of the obstruction of the circulation which is occasioned during the act of vomiting; for the same reason also they ought not to be administered in diseases of the larger arteries, as in aneurism. From the violent action of the abdominal muscles which is caused, the act of vomiting is attended with great risk in the advanced stages of pregnancy, in hernia, and in prolapsus uteri.

AMMONIÆ SESQUICARBONAS.—*Sesquicarbonate of ammonia*, (described in the division *Antacids*), given in doses of gr. xxx. or upwards, acts as a stimulating emetic, without producing much nausea or depression. It is consequently employed in cases of great debility when the use of an emetic is indicated; as in chronic bronchitis occurring in broken-down constitutions, and in the suffocative catarrh of typhus. But in consequence of the uncertainty of its operation, mustard is generally preferred in these cases.

ANTIMONIUM TARTARIZATUM. *Tartar emetic*, (described in the division *Diaphoretics*), administered in doses of two or three grains dissolved in water, operates as a powerful emetic, producing at the same time general depression, and much nausea. The act of vomiting does not occur for from twenty minutes to half an hour after the emetic has been taken, but it is then usually energetic and frequently repeated. The emetic action of tartar emetic is *specific*, as it operates not only when introduced into the stomach or rectum, but when injected into the veins, or otherwise introduced into the vascular system. It is employed as an emetic in all cases in which we wish to produce a powerful impression on the system, and at the same time lower the circulation; as in the early stages of febrile or inflammatory diseases, when if given at the very commencement of the symptoms, the disease is frequently cut short; with this view it is employed in common continued fever, in acute ophthalmia, in croup, in hooping cough, in hernia humoralis, in bubo, &c. In cases of threatened suffocation from the lodgment of solid bodies in the œsophagus, tartar emetic has been successfully injected into the veins to produce vomiting and the expulsion of the substance. In cases of poisoning, it is inferior to other remedies of this class, in consequence of the slowness of its operation and its depressing effects. Tartar emetic is also frequently administered with the intention of producing nausea without causing vomiting; with this view it is used in cases of strangulated hernia, to cause relaxation of the parts and permit the return of the contents of the sac, in rigidity of the os uteri obstructing labour, in dislocation to relax the muscular system, and in spasmodic stricture. It is best administered in distilled water; gr. ij. may be

dissolved in f3viii. of water, and of this f3ij. should be administered every ten minutes until vomiting is produced, or f3j. every quarter of an hour if it is wished to produce nausea merely. It is sometimes given in the form of enema; for this purpose gr. vj. are to be dissolved in Oj. of tepid water; in this form, however, its operation is uncertain. For injection into the veins, gr. ij. or gr. iij. are dissolved in f3ij. of tepid distilled water.

CUPRI SULPHAS. *Sulphate of Copper* (described in the division, *Astringents*), in doses of from gr. xij. to gr. xv. operates as a speedy and effectual emetic, producing generally a single but complete evacuation of the contents of the stomach, without causing any depression of the system. It is applicable only to cases of poisoning, but as it is apt to act as a powerful irritant if it does not speedily produce vomiting, sulphate of zinc should be preferred to it for that purpose; for the same reason it should be given in the full doses above mentioned.

IPECACUANHA, D. L. E. *Ipecacuanha*. *Root of Cephaëlis ipecacuanha*. A native of Brazil; belonging to the Natural family *Cinchonaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Root perennial, generally simple; Stem, shrubby, ascending, 2 to 3 feet long; Leaves, opposite, ovato-lanceolate, 4 to 8 placed at the end of the stem and branches; Flowers, white, in terminal, pendulous heads; Fruit, a fleshy black berry.

PREPARATION.—The roots are gathered at all seasons of the year, cut from the stems, dried in the sun, and packed in bundles of various size.

PHYSICAL PROPERTIES.—Ipecacuan root is in pieces from three to six inches long, about the thickness of a writing pen, irregularly twisted and bent, presenting many circular depressions at short intervals, which give the root an annulated appearance, resembling a number of rings placed side by side on a common axis. It breaks with a short, clean fracture, presenting an outer cortical portion of a grayish, or grayish-brown colour, and a white woody centre (*medullium*). It is readily reduced to powder, which is of a pale brownish-yellow colour, has a faint, nauseous, peculiar odour, and a bitter, somewhat acrid taste.

CHEMICAL PROPERTIES.—The cortical portion of the root is the more active; according to the analysis of Pelletier, it consists of 16 per cent. of a peculiar alkaloid named *emetina*, and in which the active properties of the drug reside, 2 of a fat oily matter, 6 of wax, 10 of gum, 42 of starch, and 20 of lignin. Further experiments have proved however that the *emetina* procured was a very impure preparation, and that ipecacuanha root did not yield more than 1 per cent. of the *emeta* or *emetina* in a pure state. It is prepared by dissolving 1 part

of an alcoholic extract of ipecacuanha in 10 parts of water, filtering to remove the fatty matter, and adding 1 part of calcined magnesia; evaporating with a gentle heat to dryness, pulverising, washing with cold water, drying and pulverising again; exhausting the powder with boiling alcohol, distilling off the spirit, treating the dry residue with weak sulphuric acid and animal charcoal; and finally precipitating the *emetina* with ammonia. Emetina, as commonly met with, is a dark pasty-looking substance, but when pure is white and pulverulent, inodorous, with a faint bitter taste, alkaline, very soluble in alcohol, sparingly soluble in water, and less so in ether; it is composed of $C^{35} H^{25} N^1 O^9$. Ipecacuanha yields its active principles to water and to alcohol.

Adulterations.—Spurious ipecacuan roots are frequently substituted, especially on the Continent, for the true root, but as none of them present the precise characters of the latter, as given above, the fraud is readily detected. The powder is generally supposed to be adulterated, but of this we can only judge by its medicinal activity.

THERAPEUTICAL EFFECTS.—In full medicinal doses, ipecacuan operates as a certain but mild emetic, at the same time increasing remarkably the secretions. It resembles tartar emetic in the time which elapses after it has been taken before its effects are produced, and also in the act of vomiting being repeated several times; and it differs from that substance in not causing so much nausea or general depression; it has less tendency to act on the bowels. As an emetic, ipecacuanha is adapted for children, for the old and debilitated, or for delicate females, where we wish to produce vomiting without depressing the vital powers; and also for cases where the indication is to increase the secretions of the pulmonary organs. Thus, it is used with benefit in the gastric febrile disorders of children, to evacuate the contents of the stomach; at the approach of the paroxysm in ague, hysteria, or whooping cough, when it frequently checks the developement of the fit; and it is generally given in conjunction with tartar emetic in the febrile and inflammatory disorders in which that substance is employed. As an emetic, ipecacuanha is to be preferred to tartar emetic, where there is any tendency to irritation or inflammation of the digestive organs; it is inferior to the metallic sulphates in cases of poisoning, on account of the slowness of its operation. *Emetina* has been very little used in medicine; the only advantages which it possesses over ipecacuanha are the smallness of the dose required to produce vomiting and its freedom from the unpleasant odour and taste of that substance: these are, however, more than counterbalanced by the dangerous symptoms which would result from an overdose. (See, *Epispastics* and *Expectorants*).

DOSE AND MODE OF ADMINISTRATION.—In powder, as an emetic, the usual dose of ipecacuanha is from gr. xij. to gr. xx.; but gr. v. or gr. vj., are frequently sufficient; it is best given mixed with warm water, and its action promoted by tepid drinks; gr. j. is usually sufficient to act as an emetic for an infant. In combination with tartar

emetic, gr. xij. are mixed with gr. j. of that substance. The dose of impure *emetina* is from gr. ss. to gr. iij.; of the pure article from gr. $\frac{1}{8}$. to gr. ss.; either may be given dissolved in water with the aid of a few drops of diluted sulphuric acid.—*Vinum Ipecacuanhæ*, D. L. E. (Ipecacuan root, in coarse powder (bruised, L., in moderately fine powder, E.), ℥iiss. ; sherry wine, Oij.; macerate for 14 (7, E.) days (with occasional agitation, then strain with expression, D.), and filter). As an emetic, very generally employed for children, in doses of from min. xx. to f℥j. ; seldom for adults, dose, f℥ij. to f℥iv. —*Syrupus Ipecacuanhæ*, E. (Ipecacuan, in coarse powder, ℥iv. ; rectified spirit, Oj.; proof spirit; and water, of each, f℥xiv. ; syrup, Oviij.; digest the ipecacuan in f℥xv. of the rectified spirit at a gentle heat for 24 hours; strain, squeeze the residue, and filter. Repeat this process with the residue and proof spirit, and again with the water, unite the fluids and distil off the spirit till the residuum amounts to ℥xij. Add to the residuum f℥v. of the rectified spirit, and then the syrup). This syrup is as effectually and much more simply prepared by dissolving an alcoholic extract of the root in distilled water, and adding syrup. It is an excellent preparation for children; about min. xl. of the Edinburgh preparation are equal in strength to one grain of ipecacuanha; the dose, as an emetic for adults, is f℥ij. ; for children, min. xx. to f℥j.

INCOMPATIBLES.—The salts of lead, and of mercury; the vegetable acids; and all astringent vegetable infusions.

SCILLA. *Squill* (described in the division, *Diuretics*), in full medicinal doses, generally produces nausea and vomiting; its action, however, is uncertain, and therefore it is not much used as an emetic. It is sometimes given to children with this intention in hooping cough, and in the advanced stages of bronchitis or of croup. In consequence of its stimulating effects, it is inadmissible where there is any tendency to inflammation. The preparation of squill usually employed as an emetic is the following:—*Syrupus Scillæ*, D. E. *Oxymel Scillæ*, L. (“Take of vinegar of squill, eight fluid ounces; refined sugar, in powder, one pound. Dissolve the sugar in the vinegar of squill, with the aid of a steam or water heat,” D.—“Honey, despumated, *by weight*, ℔iij. ; vinegar of squill, Oiss.; boil with a gentle heat, in a glass vessel, to the consistence of syrup,” L.—“Squill vinegar, Oij.; pure sugar, in powder, ℔viij. ; dissolve with the aid of a gentle heat, and agitation,” E.). Dose, as an emetic, for children, f℥j. every quarter of an hour until vomiting is produced.

SINAPIS, D. L. SINAPI, E. *Flour of the seeds of Sinapis alba and Sinapis nigra*, D.—of *Sinapis nigra*, L. E.—generally mixed with those of *Sinapis alba*, and deprived of fixed oil by expression, E.

Flour of Mustard; Mustard. Indigenous plants; belonging to the Natural family *Cruciferae* (*Brassicaceae*, Lindley), and to the Linnaean class and order *Tetradynamia Siliquosa*.

BOTANICAL CHARACTERS.—Annual; Stem, 3 to 4 feet high; Lower leaves, large, lyrate, rough; Flowers, yellow; Pod with a very short beak, quadrangular; Seeds, dark brown. The white mustard is distinguished by the pod having a long beak, and by the seeds being yellow.

PHYSICAL PROPERTIES.—Although the London Pharmacopœia directs flour of mustard to be procured from the black variety only, table mustard, as met with in the shops, and which is always used in medical practice, is prepared from both varieties mixed in nearly equal proportions and ground. Mustard is a greenish-yellow powder, having an oily aspect, an acrid burning taste, and in the dry state a faint nauseous smell; but when moistened it emits a strong penetrating odour, very irritating to the eyes and nostrils. Black mustard is much more pungent than white.

CHEMICAL PROPERTIES.—Black mustard seeds consist of a bland fixed oil, of a peculiar acid, bitter, odourless, and uncrystallizable, which has been named *myronic acid*; of another peculiar principle resembling vegetable albumen and emulsin, which has been named *myrosyne*; and of a third peculiar principle, crystallizable and very volatile, named *sinapisin*; with other unimportant matters. When water is added to mustard, by the mutual action of these principles, a pungent volatile oil is formed, and may be obtained by distillation, but this oil does not preexist in the seeds; and it is to its formation that the active properties of mustard are due.

Adulterations.—Flour of mustard is always more or less adulterated with a variety of substances. Wheaten flour which is generally (always, according to Christison) mixed with it, may be detected by tincture of iodine turning a cooled decoction blue. Of any other sophistications we can only judge by the physical properties of the specimen.

THERAPEUTICAL EFFECTS.—Mustard is a powerful stimulating emetic, and should be preferred to any other remedy of this class when the sensibility of the stomach is greatly reduced, or the vital power is low. Thus, it is employed with much advantage in narcotic poisoning, in intoxication threatening apoplexy, in malignant cholera, in some forms of apoplexy and of paralysis, and in suffocative catarrh occurring in the aged or debilitated.

DOSE AND MODE OF ADMINISTRATION.—As an emetic, mustard is given in doses of ʒss. to ʒj.; it is best administered mixed with fʒvj. or fʒviij. of tepid water.

VIOLA ODORATA.—The root of this plant (which has been described in the division *Cathartics*), though not officinal in the British pharmacopœias, possesses well marked emetic properties, which depend on the presence of an alkaloid named *violina*; this principle

operates precisely similar to *emetina*, and has been found to exist in the roots of all the species of the genus *Viola*. In their action on the system, violet roots resemble ipecacuanha, for which they would form an excellent substitute; and as many of the species are indigenous, the subject is worthy of more attention than has been hitherto bestowed on it. The dose of the powdered root is from ʒss. to ʒj.

ZINCI SULPHAS. *Sulphate of Zinc* (described in the division *Astringents*), in full medicinal doses from gr. xv. to gr. xxx. operates as a speedy, safe, and efficacious emetic, not producing much nausea or depression. It is therefore preferred to all other medicines of this class in cases of poisoning. It is also applicable to any case in which we wish to produce a single but complete evacuation of the contents of the stomach. As an emetic, sulphate of zinc is best administered in the full doses above stated, dissolved in three or four ounces of tepid water.

CHAPTER X.

EMMENAGOGUES.

EMMENAGOGUES are medicines which are supposed to be capable of promoting the menstrual discharge. That any substances have a direct or specific power over the uterine organs has been doubted by many, in consequence of the uncertainty of operation of the so called specific emmenagogues, and also as the uterus is not an organ intended for the elimination of foreign matter. But there are a few medicines which are employed to promote the menstrual secretion, and which appear to act solely as stimulants to the uterus, and these alone will be considered in this chapter. Suppression or absence of the menstrual discharge is generally the effect of some morbid state of the system, and therefore the remedies which are to be employed must have reference to this morbid state. Thus, when amenorrhœa is the consequence of general debility, we must have recourse to tonics and stimulants; and when it occurs with a state of plethora, venesection and other debilitating plans of treatment must be employed. Substances which stimulate powerfully the neighbouring organs act *relatively* on the uterine vessels, and therefore are often effectual in restoring the menstrual discharge. Thus, some of the more *acrid cathartics*, as aloes, gamboge, &c.; and the *stimulating diuretics*, as the turpentine, cantharides, &c., are frequently the most certain emmenagogues.

CROCUS, L. E. CROCUS SATIVUS, STIGMATA, D. *The stigmata of Crocus sativus; Saffron.* A native of Asia Minor, now naturalized in England; belonging to the Natural family *Iridaceæ*, and to the Linnæan class and order *Triandria Monogynia*.

BOTANICAL CHARACTERS.—Root, a round cormus; Leaves, linear, with a white central stripe; Flowers, appearing in September and October, light purple with red veins; Style single, stigma protruded, drooping, in three deep linear divisions, fragrant.

PREPARATION.—Early in the morning, the flowers are gathered, just as they are about to blow, the stigmata with part of the style picked out, and the rest of the flower thrown away; the stigmata are then spread loosely on white paper, and dried on a small kiln of a peculiar construction. Formerly the over-ripe or injured stigmata were dried under pressure between folds of paper, when they constituted what was called *Cake saffron*, now no longer met with.

PHYSICAL PROPERTIES.—Saffron, *Hay saffron*, consists of the dried stigmata in loosely aggregated masses; the colour is deep orange, the odour powerful and agreeably aromatic, in large quantities stupifying; the taste is pungent, aromatic, and somewhat bitter. It is imported from Spain and France, English saffron being never met with in the market at present. According to Pereira, "one grain of good commercial saffron contains the stigmata and styles of nine flowers; hence, 4320 flowers are required to yield one ounce of saffron."

CHEMICAL PROPERTIES.—Saffron consists of albumen, mucilage, a colouring extractive matter named *polychroite*, which constitutes $\frac{1}{3}$ ds of its weight, volatile oil, &c. It yields its properties readily to water and to alcohol; its solution in either being of a deep orange colour.

Adulterations.—In consequence of the high price of saffron, it is very much adulterated; the petals of the *Carthamus tinctorius* and of the *Calendula arvensis*, pomegranate blossoms, and fibres of smoked beef are used for this purpose. The flowers may be detected by the difference of their structure, when a specimen is soaked in water; the fibres of beef, by the odour which they emit on being burned. What is at present sometimes sold in England for *cake saffron*, consists of the petals of the *Carthamus tinctorius* made into a paste with gum water. Of the qualities of saffron, we judge by its sensible properties.

THERAPEUTICAL EFFECTS.—Saffron is a stimulant of weak power, exerting a specific influence, by no means well marked, over the uterine organs; hence, it is generally said to be emmenagogue. In the present day it is scarcely ever employed in medicine, except to give odour and colour to mixtures. On the continent it bears a high character as a remedy for the severe lumbar pains which so frequently precede or accompany menstruation.

DOSE AND MODE OF ADMINISTRATION.—In substance, gr. xij. to ʒj.—*Syrupus Croci*, D. L. E. ("Take of saffron, chopped fine, half an ounce; boiling distilled water, one pint; refined sugar, in powder, as much as is sufficient. Infuse the saffron in the water, in a covered vessel, for twelve hours, then boil for five minutes, and strain through calico with expression; let the decoction stand until the sediment subsides, and having then decanted the clear liquor, add to it twice its weight of sugar, and dissolve with the aid of steam or water heat," D.—"Saffron, 3x.; boiling water, Oj.; sugar, ℥iij.; infuse the saffron in the water for 12 hours in a lightly covered vessel; strain the liquid and add the sugar to it," L. E.). Dose, fʒij. to fʒss.; chiefly used for its fine colour.—*Tinctura Croci*, D. E. ("Take of saffron, chopped fine, two ounces; proof spirit, one pint. Macerate for fourteen days, strain, express, and filter," D.—"Saffron, chopped fine, ʒij.; proof spirit, Oij.; prepared like tincture of cinchona, either by percolation or digestion, the former method being more convenient and expeditious," E.). Dose, fʒj. to fʒij.

ERGOTA, D. L. E. *The Ergot of Secale cereale, a peculiar excrescence, supposed to be caused by a parasitical fungus, D. Acinula clavus, L. An undetermined fungus with degenerated seed of Secale cereale, E. Ergot of rye.* Much difference of opinion exists as to what this substance really is; the latest and best authorities agree, that it is a peculiar species of fungus, (*Spermoëdia clavus* of Fries and Lindley; *Ergototia abortifaciens* of Quekett and Pereira), which is produced under certain circumstances as yet not fully ascertained, on plants belonging to the Natural families *Graminaceæ*, *Cyperaceæ*, and *Palmaceæ*, but on none so frequently as on the *Secale cereale* or common rye.

PHYSICAL PROPERTIES.—Ergot, or spurred rye, consists of angular, sometimes round bodies, from the third of an inch to an inch and a-half in length, retaining the longitudinal depression of the sound grain, obtuse at the extremities, curved like the spur of a cock, whence the name. It is of a violet-brown colour externally, sometimes whitish; yellowish internally. In the entire state, the odour is very faint, but when powdered it has a heavy, mawkish, somewhat animal smell; the taste is acrid and disagreeable; it is firm and fragile, breaking with a clear transverse fracture. It attracts moisture, if exposed to the air, swells, and becomes mouldy, and is attacked by a small insect, a species of *acarus*, which devours the interior and leaves the grain a mere husk, no longer fit for medical purposes; ergot of rye should therefore be kept in well-stopped bottles. Van Ryn recommends as the most effectual method of preserving ergot, to dry it with a stove heat, pulverise immediately, mix the powder with an equal quantity of powdered white sugar, and keep it in well-stopped glass bottles: thus prepared, he states that it retains its medicinal powers unimpaired for four years.

CHEMICAL PROPERTIES.—According to the analysis of Dr. Wright, ergot consists of 31 per cent. of a thick white oil, 5.50 of osmazome, 9 of mucilage, 7 of gluten, 11.40 of fungin, 3.50 of colouring matter, 26 of fecula, and 3.10 of salts. The fixed oil, on which Dr. Wright supposes the active properties of the drug depend, is of a reddish-brown colour, lighter than water, and soluble in alcohol, ether, the volatile oils, and solutions of the caustic alkalis; it is readily procured by evaporating with a gentle heat an ethereal tincture of the ergot prepared by percolation. M. Bonjean has recently examined with great care the chemical, toxicological and therapeutical properties of ergot. He has found it to contain two very distinct active principles, the one a soft, reddish-brown extract, very soluble in water, which he has named *ergotin*, and on which the obstetrical and anti-hemorrhagic properties of the substance depend; and the other, a colourless fixed oil, very soluble in ether, and which alone is the poisonous principle. He obtains the ergotin by percolating powdered ergot with cold water, evaporating the product in a water bath to the consistence of an extract, treating this watery extract with rectified spirit, and evaporating the alcoholic solution thus obtained; this alcoholic extract is the ergotin. By

this process a reddish-brown, homogeneous extract is obtained; it has a pungent bitter taste, and an odour resembling that of roast meat. It forms with water a beautiful red solution, limpid and transparent. 500 parts of ergot yield from 70 to 80 of ergotin. From these results, then, it would appear that water must be the best menstruum for extracting the active principles of ergot of rye.

Adulterations.—Plaster of Paris, and common paste artfully coloured, are substituted for, or mixed with ergot of rye; they are difficult of detection. We should, therefore, attend to the characteristics of good ergot as given by Wright.—“It should be clear and smooth on the surface, not powdery, of a deep purple colour, neither totally black nor light brown, having a full strong odour, breaking clearly, exhibiting a pink blush interiorly, unpunctured by insects, burning with a clear jetting flame, and being of a less specific gravity than water.” But Bonjean states that he has found ergot which is white internally, fully as active as that which is pink.

THERAPEUTICAL EFFECTS.—Ergot of rye in single large doses, from ʒij. to ʒviij., produces nausea, pain in the head, and vertigo, generally followed in from twelve to twenty-four hours by delirium and stupor, with dilatation of the pupil and great depression of the pulse. In medicinal doses, from gr. xv. to gr. xl., it exerts a specific influence on the uterine organs, chiefly manifested by a stimulant effect on the muscular fibres of the uterus, exciting them to increased contraction. Ergot of rye is chiefly used in medicine, to accelerate delivery in cases where the childbirth is delayed, in consequence of feeble or languid contractions of the uterus; to cause the expulsion of the placenta retained from a similar reason; to stimulate the uterus to expel sanguineous clots, hydatids, or polypi; to promote the lochial discharge, and to check leucorrhœa, or hemorrhage from the womb; all of which effects are the result of augmented contractility of the uterus. The power of ergot to produce the catamenial discharge in amenorrhœa is doubted by many, nevertheless in chlorotic amenorrhœa after the administration of ferruginous preparations for some days, I have in several cases employed the infusion with most beneficial results. The circumstances which contraindicate the employment of ergot in parturition, are want of dilatation of the os uteri, great rigidity of the soft parts, deformity of the pelvis, and mal-presentation. Most practitioners also agree in advising that it should not be administered in the earlier stages of labour, or in first pregnancies. It is now very generally admitted that the administration of ergot of rye during labour endangers the life of the fœtus; and that this depends on the poisonous action of the drug, as evidenced by its effects on the action of the heart both of the mother and child, is shown in a valuable report by Dr. Hardy, in the 27th volume of the first series of the *Dublin Medical Journal*. It is therefore requisite that after the administration of ergot during labour, any change in the action of the fœtal heart should be carefully watched by the employment of the stethoscope, and if the number of the

beats be reduced below 110, *with intermissions*, instrumental delivery must be had recourse to, to save the life of the child. The *ergotin* of M. Bonjean is, however, stated by him to be entirely void of the poisonous property, and, if such be proved to be the case, this great objection to the employment of ergot will be overcome by the use of it. The effects produced by the continued use of ergot as an article of food are very singular, and have been fully described by different writers; any detailed account of them, however, would be quite foreign to the scope of this work; I must, therefore, refer the reader to Dr. Wright's excellent treatise in the 52nd and 53rd vols. of the *Edinburgh Medical and Surgical Journal*.

DOSE AND MODE OF ADMINISTRATION.—In powder, which should be always prepared for use, for a woman in labour, the dose is ℥j. repeated every half hour until ʒj. has been taken, unless its effects are sooner produced. For other cases, gr. v. to gr. x. three times a day; it may be administered diffused through peppermint or cinnamon water.—*Infusum Ergotæ*, D. (Take of ergot of rye, in coarse powder, two drachms; boiling water, nine ounces. Infuse for one hour, in a covered vessel, and strain. The product should measure about eight ounces). Dose, during parturition, $\frac{1}{3}$ of this, repeated at intervals of half an hour, unless its effects be sooner produced; for other cases, the dose is fʒss. to fʒj.; some aromatic tincture should be added to this preparation and to the next, to conceal their nauseous taste. A decoction may be prepared with the same proportions by boiling for ten minutes and straining.—*Tinctura Ergotæ*, D. (Take of ergot of rye, in coarse powder, eight ounces; proof spirit, two pints. Macerate for fourteen days, strain, express, and filter). This tincture might be more conveniently prepared by percolation. Dose, in slow parturition, fʒss. to fʒj.; in other cases, min. x. to min. xx.—*Tinctura Ergotæ etherea*, (Similarly prepared, substituting sulphuric ether for proof spirit). The dose is the same.—*Ergotin*, BONJEAN. Dose, from one grain and a-half to three grains every quarter of an hour during labour; in other cases this dose may be given three or four times a day. It may be prescribed in pill made with liquorice powder and mucilage, or dissolved in water and sweetened with syrup of orange flowers or syrup of saffron.

RUTA GRAVEOLENS. *Rue* (described in the division *Antispasmodics*), was formerly highly esteemed as an emmenagogue, and at present is a popular remedy as such; it is sometimes resorted to for the purpose of procuring abortion. Although it undoubtedly possesses a direct stimulating influence on the uterine organs, it is scarcely ever employed in regular practice in the present day, for any of the purposes for which this class of remedies is administered.

SABINA, D. L. E. *Tops*, (*tops both fresh and dried*, L.) of *Juniperus sabina*; *Savin*. A native of the South of Europe, cultivated in this country; belonging to the Natural family *Coniferae* (*Pinaceæ*, Lindley), and to the Linnæan class and order *Diœcia Monadelphica*.

BOTANICAL CHARACTERS.—An evergreen, small, bushy shrub; Leaves, very small, ovate, pointed, densely imbricated; it flowers in April and May, and ripens its fruit, a dark purple *galbulus* or berry about the size of a currant, in autumn.

PHYSICAL PROPERTIES.—As met with in the shops, savin consists of the young tops and their attached leaves; in the fresh state they are of a bright green colour, have a heavy peculiar, terebinthinate odour, and a bitter nauseous taste. When dry their colour is yellowish-green, and their odour much weaker.

CHEMICAL PROPERTIES.—Savin tops consist of resin, volatile oil, gallic acid, extractive, &c. The medicinal properties are due to the volatile oil, which may be obtained by the processes of the Colleges, fbij of the tops yielding $\text{f}\overline{3}\text{v}$. of oil; it is limpid and nearly colourless, having the odour of the plant, and a hot acrid taste; its composition is $\text{C}^{10} \text{H}^8$, being isomeric with oil of turpentine; and its density .915. Savin communicates its odour and taste to water and to alcohol; the alcoholic tincture is of a bright green colour.

THERAPEUTICAL EFFECTS.—Savin is a powerful stimulant to the uterine organs, and is employed as an emmenagogue with much benefit in amenorrhœa and chlorosis, depending on torpid or deficient action of the uterine system. In consequence, however, of its poisonous properties, it should be used with caution; its employment is contraindicated where there is the least tendency to irritation or inflammation of the uterus or any of the pelvic viscera. Savin is the drug usually resorted to by the vulgar for the purpose of producing abortion, but it cannot effect this, except at the risk of the life of the mother.

DOSE AND MODE OF ADMINISTRATION.—In powder, a bad form, the dose is from gr. v. to gr. xv.—*Oleum Sabinæ*, D. E. (Obtained from the tops according to the general process for obtaining volatile oils. See page 176). Dose, from min. ij. to min. vj.—*Infusum Sabinæ*, (Fresh Savin tops, 3j .; boiling water, $\text{f}\overline{3}\text{viij}$.; macerate for one hour in a covered vessel). Dose, $\text{f}\overline{3}\text{ss}$. to $\text{f}\overline{3}\text{j}$.

In cases of poisoning with savin, emetics should be first employed to remove the poison from the stomach; and afterwards opiates and demulcents, to be followed by general antiphlogistic treatment.

SODÆ BIBORAS. *Borax* (described in the division, *Astringents*), though not ordinarily employed in medicine as an emmenagogue, possesses a powerfully stimulant action on the uterine organs. It is sometimes used empirically to cause abortion, an effect which its incautious administration in regular practice has in more than one instance produced.

CHAPTER XI.

EMOLLIENTS.

(Demulcents ; Relaxants).

EMOLLIENTS may be defined, substances which diminish the vital tone or cohesion of the solid tissues of the body, and thereby render them more lax and flexible; or which by diminishing acrimony, protect the sensible surfaces of the body from the action of acrid matter. This division of medical agents has been stated by many to act merely mechanically, by lubricating and softening the parts to which they are applied, or by sheathing them from the action of matters which are capable of irritating them. But this explanation cannot possibly apply to those substances, which, when introduced into the stomach, operate on remote parts of the body. Emollients, therefore, seem to act either directly on the part to which they are applied, or indirectly through the medium of the circulation. They are principally employed in the treatment of inflammations either general or local, in painful ulcerations, in diseases of the urinary organs, and in poisoning with acrid substances; but in all these cases they are only used to alleviate symptoms. Of the non-medicinal substances used as emollients, warm water is the most important, and the higher the temperature at which it can be applied without the actual production of pain, the greater will be its emollient power; for this reason, it will be found productive of most advantage when employed in the form of vapour.

ADEPS SUILLUS, D. ADEPS, L. AXUNGIA, D. E. *Fat of Sus scrofa* ; *Hog's-lard* ; *Axunge*. *Sus scrofa*, the common hog, belongs to the class *Mammalia*, order *Pachydermata*. The fat is usually taken from about the loins, from the omentum and from the mesentery, and is melted and strained to separate the membranes.

PREPARATION.—Lard as sold for general use usually contains salt, which has been added to prevent it from becoming rancid ; consequently to prepare it for medical purposes, the following formula is given in the *Dublin Pharmacopœia*.—*Adeps suillus præparatus*. “Take of lard of commerce, any convenient quantity : melt it in twice its weight of boiling water, stirring the mixture constantly ; then set the mixture aside to cool, and separate the lard when it has solidified.”

PHYSICAL PROPERTIES.—Axunge is a white, solid, fatty matter,

with a very faint odour, and a mild sweetish taste. Specific gravity, .881.

CHEMICAL PROPERTIES.—It is composed of 38 per cent. of *stearin* and *margarin*, and 62 of *oleïne* or *elaïne*. It melts at about 85° F. into a clear transparent liquid, which if water be present is whitish or milky; exposed to the air axunge undergoes a process of decay, becoming *rancid*, when it acquires a peculiar unpleasant odour and acrid properties; in this state it is unfit for medical purposes.

THERAPEUTICAL EFFECTS.—Axunge is not used in medicine internally, its action on the body is nutritive and emollient. As an external agent it is employed as a basis for ointments, cerates, and liniments.

ADEPS OVILLUS. SEVUM, L. E. *Fat of Ovis aries; Suet; Mutton-suet.* *Ovis aries*, the sheep, belongs to the class *Mammalia*, and order *Ruminantia*. The fat is selected from the neighbourhood of the kidneys, melted, and strained to separate the membranes. Mutton suet is nearly similar in physical and chemical properties to axunge, and is employed for the same purposes; it is sometimes preferred to axunge in consequence of its greater consistence and higher melting point.—It has been omitted from the last edition of the Dublin Pharmacopœia.

ALTHÆA OFFICINALIS, FOLIA ET RADIX, L. E. *The leaves and root of Althæa officinalis; Common Marsh-mallow.* An indigenous plant; belonging to the Natural family *Malvaceæ*, and to the Linnæan class and order *Monadelphæa Polyandria*.

BOTANICAL CHARACTERS.—Stem, two to three feet high, downy; Leaves, heart-shaped, exquisitely soft and pubescent; Flowers, on axillary stalks, large, pale rose-colour.

PHYSICAL PROPERTIES.—The roots are fusiform, from 12 to 18 inches long, about the thickness of the finger, yellowish externally, white and fibrous within; the odour is faintly nauseous, the taste sweet, and very mucilaginous. The leaves have a weaker odour, and a less mucilaginous taste.

CHEMICAL PROPERTIES.—The roots consist of gum, uncrystallizable sugar, starch, yellow colouring matter, *asparigin*, albumen, &c. They yield their mucilaginous properties to water.

THERAPEUTICAL EFFECTS.—Marsh-mallow root is one of the most commonly employed emollients on the continent, but is not much used in this country. As an internal remedy it is given in inflammation of the mucous membranes, as in gonorrhœa, cystitis, nephritis, bronchitis, &c., either alone or as a vehicle for other medicines. Externally, the leaves are generally employed in the acute phlegmasiæ in the form of decoction or cataplasm.

DOSE AND MODE OF ADMINISTRATION.—*Mistura Althææ*, E. (Dried root of *althæa officinalis*, ʒiv.; raisins, freed of the seeds, ʒij.; boiling water, Ov.; boil down to Oij.; strain through linen or calico; and when the sediment has subsided, pour off the clear liquor for use). Dose, fʒj. to fʒij. frequently repeated.—*Syrupus Althææ*, L. E. (Fresh *althæa* root, bruised (sliced, E.), ʒviiij.; pure sugar, lbiss.; water, Oiv.; boil the water with the root down to one half; strain and express strongly (through calico, E.), and set aside for 24 hours that the dregs may subside; pour off the clear liquor, add the sugar, and boil down to a proper consistence). This syrup does not keep well. The dose is from fʒss. to fʒj.

INCOMPATIBLES.—Iodine; and tincture of the sesquichloride of iron.

AMYGDALÆ DULCES, D. L. E. ET, AMYGDALÆ AMARÆ, L. E. *Kernels of the fruit of Amygdalus communis, var. dulcis, D.—of the two varieties of Amygdalus communis, L. E. Sweet almonds; and Bitter almonds.* The almond tree is a native of Syria and Barbary; but grows freely throughout the South of Europe; it belongs to the Natural family *Rosaceæ* (*Drupaceæ*, Lindley), and to the Linnæan class and order *Icosandria Monogynia*.

BOTANICAL CHARACTERS.—A small tree, with acuminate, serrulate leaves, petiolate; Gland on the petioles of the bitter almond variety, on the leaves of the sweet almond; Flowers, sessile, appearing before the leaves, white or rose-coloured; Fruit, an ovoid drupe, leathery, marked with a longitudinal furrow where it opens when ripe, containing a hard rough shell (*putamen*) marked with pits or furrows, within which is the seed or kernel.

PHYSICAL PROPERTIES.—Sweet almonds vary in size from half an inch to above an inch in length, and are about three-eighths of an inch in breadth; they are oblong, compressed, and pointed at one end; the *episperm* or outer covering is reddish-brown covered with a yellowish dust; the parenchyma or *episperm* is white, hard and oleaginous, inodorous, having a sweet bland taste. Bitter almonds are generally smaller, they are characterized by their bitter taste, and peculiar odour when rubbed with water. Several sorts of sweet almonds are met with in commerce, the principal of these are Jordan and Valentia almonds; the former come from Malaga, and are the most esteemed; they are longer and more pointed than the latter, which are brought from Valentia. Bitter almonds are imported from Mogadore.

CHEMICAL PROPERTIES.—Sweet almonds consist of fixed oil, emulsin, liquid sugar, gum, &c. In addition to these the bitter almond contains a peculiar principle named *amygdalin*, which, when brought in contact with water, from a mutual re-action between it and the emulsin, generates an essential oil, which will be more particularly described hereafter, (See, *Sedatives*). The fixed oil, *Oleum Amygdalarum*, L. is an article of the *Materia Medica* in that pharma-

copœia; in obtaining it the almonds are expressed without heat, and for this purpose either sweet or bitter almonds may be employed; the latter as being cheaper are generally used; 1 *cwt.* of almonds yields from 48 to 52 lbs. of oil. It is a bland, pale-yellow, inodorous, very liquid oil; lighter than water, its density being about .920; it consists of 76 per cent. of *oleïne*, and 24 of *margarine*; it requires 6 parts of boiling, or 25 of cold alcohol for its solution; but is very soluble in ether.

THERAPEUTICAL EFFECTS.—Sweet almonds are nutritive and emollient; they should be *blanched*, deprived of the husk or pellicle, before being used, as from its acidity it has been known to produce nausea and irritation of the stomach and bowels, in some instances followed by an eruption on the skin. In medicine the preparations of the sweet almonds are used as emollients, chiefly in inflammation of the genito-urinary mucous membrane, to lessen the acrimony of the urine, and with the same intention in calculous affections. The oil is seldom given internally, according to some it possesses mildly laxative properties; externally it is used for frictions, and as an ingredient in some soaps.

DOSE AND MODE OF ADMINISTRATION.—*Confectio (Conserva, E.) Amygdalarum*, L. E. (Sweet almonds, 3viiij.; powdered gum arabic, 3j.; pure sugar, 3iv.; blanch the almonds, and beat them with the gum and sugar into a uniform pulpy mass. "This confection may be kept unchanged longer if the almonds, acacia, and sugar, separately powdered, are afterwards mixed, then whenever the confection is to be used, beat all the ingredients together until they are thoroughly incorporated," L.). This confection is only used for the preparation of the emulsion.—*Mistura Amygdalæ*, D. ("Take of sweet almonds, five drachms; refined sugar, two drachms; gum arabic, in powder, one drachm; distilled water, eight ounces: steep the almonds in hot water for five minutes, and, having removed their external coat, beat them with the sugar and gum, in a mortar, into a coarse powder; add the water gradually, and triturate so as to form a uniform mixture. Finally, strain through muslin").—*Mistura Amygdalarum*, L. E. (Almond confection, 3iiss. (3ij. E.); water (distilled, L.), Oj. (Oij., E.); add the water to the confection gradually, triturating until they are mixed; and strain through linen. Or it may be prepared as follows, E.—"Sweet almonds, 3j. 3ij.; pure sugar, 3v.; mucilage, f3ss.; water, Oij.; blanch the almonds, beat them to a smooth pulp in an earthen-ware mortar, first with the sugar, then with the mucilage; add the water gradually, constantly stirring, and strain through linen or calico"). Generally employed as a vehicle for other medicines in doses of f3j. or f3ij. Acids and alcohol, and of course tinctures, are incompatible with almond emulsion.

of *Triticum hybernum*, L.—of *Triticum vulgare*, E. Starch; *Wheaten starch*. The common wheat, *Triticum vulgare*, of which *T. æstivum* and *T. hybernum* are varieties, is a native of the country of the Baschkirs, and is cultivated throughout all Europe. It belongs to the Natural family *Graminaceæ*, and to the Linnæan class and order *Triandria Digynia*.

BOTANICAL CHARACTERS.—Culms, simple, glaucous, jointed; Leaves, alternate, linear, smooth, of a glaucous-green colour; Flowers, glumaceous, at the extremity of the culm; Seed (grain) ovoid, yellowish, with a longitudinal furrow.

PREPARATION.—The fecula or starch forms nearly 70 per cent. of wheaten flour. It is procured by steeping the flour in water for one or two weeks until it becomes sour, drawing off the supernatant liquor; washing the residuum on sieves with repeated portions of the water, allowing the liquor which passes through to deposit the starch in large vats; and finally draining the deposited starch, and drying it in a stove.

PHYSICAL PROPERTIES.—Starch usually occurs in the form of small, irregular, hexagonal prisms; it is white, pulverulent, unalterable in the air, crackling under the fingers when lightly pressed, inodorous and insipid. Viewed under the microscope it is found to consist of various sized transparent particles, rounded or angular, uneven on the surface.

CHEMICAL PROPERTIES.—The particles of starch are composed of an external tegument termed *Amylin*, and a contained mucilage named *Amidin*. Its ultimate analysis is $C^{12} H^9 O^9 + 2 H O$, (Kane). Starch is insoluble in cold water, but may be suspended in it by trituration; it is also insoluble in alcohol and ether. In water near the boiling point it dissolves almost completely, and if sufficiently concentrated forms with it an opaque jelly, which becomes more consistent as it cools. By roasting starch, it is rendered somewhat analogous to gum, and is then soluble in cold water. With a cooled decoction of starch, iodine forms a rich blue compound (*iodide of starch*), which varies in the intensity of the colour as the iodine or starch predominates. It is only on the Amidin that iodine acts, not altering the colour of the Amylin, consequently it produces no effect on starch when merely moistened with water, requiring either trituration or heat to burst the tegumentary membrane. Amidin constitutes 995 or 996 thousands of starch, Amylin only 4 or 5 parts in a thousand.

Adulterations.—Starch is often adulterated with sulphate of lime; it may be detected by incineration, the starch being burned away and leaving the fixed sulphate. Its weight is often increased by the presence of superabundant moisture, which may be discovered by drying starch in a vapour bath, and ascertaining the loss of weight, which should not be more than ten or twelve per cent. Potato starch is sometimes sold for wheaten starch; this fraud may be readily detected by the microscope the particles of the former being much larger than those of the latter; it may also be discovered by triturating for a short time a small quantity of a suspected specimen with water in an *agate* mortar, and adding to the strained solution a few drops of tincture of iodine;—if it be pure wheaten starch, a pale

yellow colour only will be produced; but if potato starch be present, the coloration will be deep blue.

THERAPEUTICAL EFFECTS.—Wheaten starch is employed in medicine, chiefly in the form of decoction, as an emollient enema in dysentery, diarrhœa, or other inflammatory affections of the abdominal viscera; it is also used as a vehicle for more active remedies, and for suspending drugs which are administered in the state of powder. Externally, starch in fine powder is applied to excoriated parts, and for preventing the formation of bed sores.

DOSE AND MODE OF ADMINISTRATION.—*Mucilago (Decoctum, L.) Amyli*, D. L. E. (Starch, ʒiv.; water, Oss. (Oj., L. E.); triturate the starch with the water gradually added, then boil for a few minutes). Used in the form of enema either alone or as a vehicle for other remedies.

AVENA, D. L. E. *The seeds (freed from the husks, L.) of Avena sativa. Oatmeal. Avena sativa*, the common oat, is generally cultivated throughout the whole of Europe; it belongs to the Natural family *Graminaceæ*, and to the Linnæan class and order *Triandria Digynia*.

BOTANICAL CHARACTERS.—Root annual; Culm, from two to three feet high; Leaves, linear, acute; Flowers, glumaceous, disposed in loose, terminal, somewhat pendant panicles; Seeds, more or less elongated, pointed at both extremities, convex at one side, marked with a longitudinal furrow on the other; white, in some varieties black.

PREPARATION.—Oats deprived of their husks are called *groats*, which, when coarsely ground, constitute *oatmeal*; the husks with some adhering starch from the seeds are sold under the name of *seeds*. These different preparations are too well known to need description.

PROPERTIES.—Oats consist of 66 per cent. of meal, and 34 per cent. of husk or *Bran*. The dried meal consists of starch, mucilage, sugar, albumen, and lignin, but no gluten. Oatmeal or groats boiled with water, in the proportion of about ʒiij. to Oijj. of water, down to one-half, constitutes *gruel*, a light article of diet for the sick or convalescent. If a larger proportion of the coarsely ground meal be used, it is called *porridge*, a principal article in the dietaries of hospitals and charitable institutions, and forming a staple article of food in Scotland and the North of Ireland.

THERAPEUTICAL EFFECTS.—Oatmeal is nutritive and emollient; it is only employed in medicine internally in the form of *gruel* above referred to. Externally it is sometimes used in the form of poultice, prepared as *porridge*, but with less boiling.

CANNA EDULIS, D. *The fecula of the Root; Tous les Mois.* The Dublin College has introduced this excellent fecula into the Materia

Medica list of their last pharmacopœia, where it is stated that the above plant is supposed to yield it; most botanical authorities, however, ascribe it to the *Canna coccinea*. Both plants belong to the Natural family *Marantaceæ*.

PROPERTIES.—Tous-les-Mois is in the form of a white powder, presenting a much more glistening aspect than either potato-starch or arrow-root, in consequence of the larger size of the globules of which it is composed, many of them being the 300th part of an inch in length, and some even so much as the 200th (Christison). It possesses the general properties of wheaten starch already described, but forms a much firmer jelly with boiling water, being in this respect equal to arrow-root.

THERAPEUTICAL EFFECTS.—As an article of diet for delicate persons or invalids, it takes the same position as arrow-root, although it at present bears a much lower price in the English market. Christison states that it is more esteemed and dearer than true arrow-root in many of the West India Islands. It is prepared for use in the same way as arrow-root. (See page 218).

CERA, L. CERA FLAVA, D. E. *Yellow wax; Unbleached bees'-wax; A secretion of the Apis mellifica or Honey-bee*, D.—*A concrete prepared by Apis mellifica*, L.—*Waxy secretion of Apis mellifica*, E.

CERA ALBA, D. L. E. *White wax; Bleached bees'-wax*. Wax is a product of many vegetables; but the wax employed in medicine is a secretion of certain glands, *wax pockets*, situated on the abdomen of the common bee; it is used by the insect for constructing the cells of the honey-comb.

PREPARATION.—It is obtained from the comb, after the honey has been removed by dripping and expression, by melting it in water and straining so as to free it from impurities; in this state it constitutes yellow wax. White wax is procured from this, by melting and agitating with water, and finally bleaching in thin ribbons in the open air; the process being repeated until it loses all colour and odour.

PHYSICAL PROPERTIES.—*Yellow wax* is in large cakes of the shape of the mould in which it has been allowed to cool; it has a gamboge-yellow colour, a dull lustre, a peculiar sweet odour, and a faint greasy taste; specific gravity, when pure, .972. *White wax* is in white cakes, with a faint yellow tinge; it is feebly translucent, inodorous, and insipid; specific gravity same as that of yellow wax.

CHEMICAL PROPERTIES.—White wax consists of two proximate principles, *cerine* and *myricine* (John); its ultimate analysis is C²⁰ H²⁰ O (Hess); yellow wax contains a little more carbon and a little less oxygen (Lewy). It is insoluble in water, and in alcohol and ether when cold; but is soluble in boiling alcohol and ether, in the fixed oils and in oil of turpentine. It fuses at 155°, and is inflam-

mable, burning without any residuum when pure. It combines with fats and resins when heated with them.

Adulterations.—Wax is adulterated, with starch, which may be detected by the action of tincture of iodine on cooled water in which it has been boiled; with resin, which may be dissolved out by alcohol; with fat or grease, which emit a peculiar odour when burned; and with flour of sulphur and other earthy or metallic substances, which are left when wax is dissolved by oil of turpentine.

THERAPEUTICAL EFFECTS.—Wax acts as an emollient, and was formerly employed as such in ulcerations of the intestines, but at present it is not used as an internal remedy. As an external agent, it forms the basis of all cerates, and is an important constituent of many ointments and plasters.

PHARMACEUTICAL PREPARATIONS.—*Unguentum Cere alba*, D. (White wax, lbj.; prepared lard, lbiv.; melt them together with a gentle heat, and stir constantly until the mixture concretes).—*Ceratum*, L. *Ceratum simplex*, E. (Olive oil, fʒiv. (6 parts, E.); white wax, ʒiv. (3 parts, E.); (spermaceti, 1 part, E.); “add the oil to the melted wax and mix them,” L. “heat the oil gently, add the wax and spermaceti, stir the whole briskly when it is fluid, and continue the agitation as it cools,” E.). These preparations, commonly known as *simple cerate*, are used as mild and cooling dressings. In the last edition of the Dublin Pharmacopœia this ointment is made the basis of all the ointments with a few exceptions.—*Emplastrum Cere*, L. *Emplastrum simplex*, E. (Wax, lbij. (ʒiv., E.); suet, lbij. (ʒij., E.); resin, lbj. (ʒij. E.); “melt together, and strain,” L.—“melt them together with a moderate heat, and then stir the mixture briskly till it concretes on cooling,” E.). Chiefly used for preparing cantharides plaster.—*Linimentum simplex*, E. (Olive oil, 4 parts; white wax, 1 part; dissolve the wax in the oil with a gentle heat, and stir well, as the fused mass cools and concretes). An emollient liniment.

CETACEUM, D. L. E.—*Spermaceti*.—A peculiar concrete substance obtained chiefly from the head of the *Physeter macrocephalus*, D.—A concrete found in peculiar cells of the head of *Physeter macrocephalus*, L.—*Cetin* of *Physeter macrocephalus*, nearly pure, E. *Physeter macrocephalus*, the great-headed cachalot, is a gregarious whale, inhabiting the Pacific Ocean, and the Indian and Chinese seas; it belongs to the class *Mammalia*, order *Cetacea*.

PREPARATION.—Although spermaceti is found in various parts of the body of the animal mixed with common fat, it is chiefly obtained from a large, triangular-shaped reservoir, existing in the head over the surface of the upper jaws, in which it is contained dissolved in oil, forming a milky-looking, oleaginous fluid. It is separated from the oil by boiling in water, from which the spermaceti crystallizes as it cools; it is then purified by being re-melted in a weak solution of potash, and the impurities skimmed off, and finally melted a third time by the agency of steam, and cooled slowly in tin moulds.

PHYSICAL PROPERTIES.—Spermaceti occurs in various-sized crystalline masses, beautifully white, which are formed of an infinite number of small brilliant scales; it is soft and unctuous to the touch, inodorous, and insipid. Specific gravity, .943.

CHEMICAL PROPERTIES.—It is composed of 2 atoms of *margaric*

acid, 1 of *oleic acid*, 3 of *cetin*, and 3 of water. It may be readily pulverised by the addition of a few drops of alcohol, or of almond oil; it is fusible at 112° , combustible, insoluble in water, and only slightly soluble in alcohol, even at a boiling temperature; it combines with fixed or volatile oils, and with melted fats. *Cetin*, which is a pure proximate principle, may be readily obtained by repeated crystallization from the alcoholic solution. It is harder than *spermaceti*; free from grease, but saponifiable with very strong alkaline solutions, and melts at 120° . Its composition is $C^{16} H^{16} O$.

THERAPEUTICAL EFFECTS.—*Spermaceti* is an emollient, and demulcent, but at present is not used internally. Externally, it is employed as an ingredient in various cerates and ointments.

PHARMACEUTICAL PREPARATIONS.—*Unguentum Cetacei*, D.—*Ceratum Cetacei*, L. (White wax, ℞ss . (3vij., L.); *spermaceti*, ℥j. (3ij., L.); (prepared lard, ℥iij., D.; olive oil, Oj., L.); melt with a gentle heat (add the oil to the *spermaceti* and wax melted together, L.), and stir constantly until cold). An emollient and cooling dressing for raw or blistered surfaces.—*Unguentum Cetacei*, L. (*Spermaceti*, 3vj.; white wax, 3ij.; olive oil, ℥iij., being melted together with a slow fire, stir constantly till they become cold). Similar to the last, but a softer preparation.

CYDONIA, L. *Quince-seeds*; the seeds of *Cydonia vulgaris*. The Quince tree is a native of the south of Europe; belonging to the Natural family *Rosaceæ* (*Pomaceæ*, Lindley), and to the Linnæan class and order *Icosandria Pentagynia*.

BOTANICAL CHARACTERS.—A small, much branched tree; Leaves, ovate, obtuse, their under surface tomentose; Flowers large, solitary or few, pale rose colour; Fruit, a variously shaped pome, yellow, austere, but very fragrant, containing many seeds.

PHYSICAL PROPERTIES.—Quince seeds are ovate, pointed, plano-convex, of a reddish-brown colour, inodorous, leaving a bitter impression on the palate when chewed for some time.

CHEMICAL PROPERTIES.—The epispem of the seed contains a large quantity of mucilage named by Pereira *Cydonin*. The substance of the seed contains besides other matters, emulsin and fixed oil, consequently emitting when moistened the bitter almond odour. The mucilaginous principle is dissolved out by boiling water.

THERAPEUTICAL EFFECTS.—Quince seeds are only employed in medicine for the mucilage which they contain, the decoction has been recommended as an emollient application to erysipelatous surfaces, and to aphthous ulcerations of the mouth.

PHARMACEUTICAL PREPARATIONS.—*Decoctum Cydoniæ*, L. (Quince seeds, 3ij.; distilled water, Oj.; boil for ten minutes over a slow fire, and strain). Never used internally. It does not keep well.

INCOMPATIBLES.—Alcohol; acids; most metallic solutions; and tincture of galls.

FARINA, D. L. E. *Flour of the seeds of Triticum aestivum*, D.—*of Triticum hybernum*, L.—*of Triticum vulgare*, E. *Wheaten flour*, (See *Amylum*).

Flour is employed in medicine for dusting excoriated or burned parts; in the form of bread it is used as a basis for making pills, but as bread always contains salt, it should not be employed for that purpose with substances which are decomposed by chloride of sodium, as the salts of silver, &c.

FICI, D. L. E. *Figs. The dried fruit of Ficus carica*. A native of Asia, and the south of Europe; belonging to the Natural family *Urticaceæ* (*Moraceæ*, Lindley), and to the Linnæan class and order *Polygamia Diœcia*.

BOTANICAL CHARACTERS.—A small tree, with large, cordate, palmate, leaves; Flowers numerous, pedicellated, inclosed within a fleshy receptacle, which is umbilicated and nearly closed at the apex, hollow within; Drupe or utricle, one-seeded, sunk into the pulpy receptacle.

PHYSICAL PROPERTIES.—Figs consist of the fleshy, pyriform receptacle, containing within numerous, small, crustaceous seeds. When fully ripe they are dried in the sun, and packed in drums, boxes, or baskets, in which forms they are imported; those in drums or boxes from Smyrna (*Turkey figs*), those in baskets from Spain and Portugal (*Portuguese figs*). Dried figs are too well known to require description.

CHEMICAL PROPERTIES.—Dried figs consist of 62 per cent. of *sugar of figs*, with gum, fatty matter, extractive and salts. They yield their sugar and gum to boiling water.

THERAPEUTICAL EFFECTS.—Figs are nutritive and emollient, and in large quantity gently laxative; they are more employed as an article of the table than in medicine. They enter into the composition of the *compound decoction of barley*, and the *confection or electuary of senna* of the London and Edinburgh Pharmacopœias. Roasted figs are applied to gum boils to promote suppuration.

GLYCERINA, D. *Glycerine. A sweet principle produced during saponification*.

PREPARATION.—Glycerine is an article of the Materia Medica introduced into the last edition of the Dublin Pharmacopœia. It is formed in the preparation of the *em-plastrum lythargyri* by the reaction of the oxide of lead on the olive oil; during the process an insoluble soap of lead is thrown down, and the glycerine remains in the aqueous liquid. The latter should be treated with sulphuretted hydrogen to remove any lead that may remain in it, digested with animal charcoal, filtered and evaporated in vacuo at the temperature of the air to the consistence of a syrup.

PHYSICAL PROPERTIES.—Glycerine is a syrupy liquid, with a sweetish taste; inodorous when properly prepared; it is usually met with in the shops of a pale yellow colour, but when concentrated by evaporation in vacuo it is nearly colourless. Its specific gravity, according to the Dublin Pharmacopœia, is 1.260.

CHEMICAL PROPERTIES.—This substance is the *sweet principle of oils*; in each fat it is united with a different acid, and is consequently regarded by chemists as the salifiable base of oils; the various oils being *salts of Glycerine*. It cannot be made to crystallize, nor can it be obtained in a solid state; it dissolves in water and alcohol, but is insoluble in ether. By heat it is volatilized in part, finally becomes dark and is decomposed. Exposed to the air it absorbs water; becomes at first yellowish, and then brownish, but does not undergo the alcoholic fermentation. The composition of Glycerine is $C^6 H^7 O^5 + HO$. It should be kept in a cool place, and in bottles completely filled.

THERAPEUTICAL EFFECTS.—Glycerine has been as yet used in medicine only as an external application, and chiefly in the treatment of cutaneous diseases, for which it was first proposed by Mr. Startin of London. He used it principally in eruptions of the scalp, in lepra, psoriasis, lichen, inveterate impetigo, and prurigo. Its medicinal effects seem to depend on its property of keeping the parts to which it is applied continuously moist; it thus allays irritation, and moreover prevents the too rapid drying of the skin, which is apt to attend the use of alkaline washes. It has also been used to moisten cotton, when introduced into the ear with the view of acting as an artificial tympanum in cases in which that membrane has been destroyed from any cause; a plan of treatment now adopted by some aurists. In *pharmacy*, glycerine may be employed to prevent pill masses from getting hard, which the addition of a small quantity effects, and also to preserve syrups and extracts.

DOSE AND MODE OF ADMINISTRATION.—Its internal employment has not been yet sufficiently tested, but it does not appear to be more active than simple syrup. Externally, it may be added to lotions, cataplasms, or ointments, in the proportion of an eighth or a sixteenth.

GLYCIRRHIZA GLABRA, D. L. E.—*The (fresh L.) root, (and extract E.) of Glycyrrhiza glabra. Liquorice.* A native of the South of Europe, now cultivated extensively in England; belonging to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Diadelphia Decandria*.

BOTANICAL CHARACTERS.—Root long, creeping, succulent; Stem, erect, smooth, 4 to 5 feet high; Leaflets, ovate, retuse, yellowish; Flowers, axillary, racemose, papilionaceous, bluish or purplish.

PREPARATION.—The root is dug up in November, when the plant is three years old, washed, and the small fibres cut off; it is imported in large quantities from Spain and

Portugal, but that grown in England is most esteemed. It may be kept fresh for many months by covering it with sand in a damp cellar.

PHYSICAL PROPERTIES.—Liquorice root is in cylindrical pieces, from one to two or three feet long, smooth and plump when fresh, wrinkled in the dry state, about the thickness of the little finger, of an umber-brown colour externally, yellow internally; it has a faint earthy odour, and a sweet mucilaginous, subacid taste.

CHEMICAL PROPERTIES.—It consists of a peculiar saccharine principle named *glycirrhizine*, albumen, fecula, *asparigin* or a principle analogous to it, some salts, and a thick, acid, resinous oil. It yields its active principles to boiling water, but as the acid oil is dissolved out by the aid of heat, the Dublin and Edinburgh Colleges direct cold water to be used for preparing the extract.

Adulterations.—Liquorice powder is often adulterated on the Continent with a yellow pigment (*French yellow*), which is readily detected, as it effervesces on the addition of hydrochloric acid.

THERAPEUTICAL EFFECTS.—Liquorice root is emollient, and demulcent; it is chiefly employed in the form of extract or decoction in catarrhal affections; it is also used to give flavour to other medicines. Liquorice powder is employed in pharmacy as a covering for pills, or to give them consistence.

DOSE AND MODE OF ADMINISTRATION.—*Extractum Glycirrhizæ*, D. L. E. ("Take of liquorice root, in thin slices, dried and reduced to coarse powder, one pound; distilled water, three pints: the method of preparation is the same as for *Extractum Gentianæ*," D.—"As extract of gentian," L.—"Cut liquorice root into small chips, dry it thoroughly with a gentle heat, reduce it to a moderately fine powder, and proceed as for extract of gentian," E.). Extract of liquorice is imported in large quantities from Italy and Spain, in the form of flattened rolls, about 5 or 6 inches long, an inch in breadth, and half an inch in thickness, enveloped in bay leaves; in this state it generally contains a large quantity of copper acquired from the boilers in which it is prepared; it is, therefore, usually purified by dissolving in boiling water and inspissating, it then forms *stick or refined liquorice*. It is used as an emollient in coughs and bronchial affections, being allowed to dissolve slowly in the mouth.—*Trochisci Glycirrhizæ*, E. (Extract of liquorice; and gum arabic, of each, ʒvj.; pure sugar, lbj.; dissolve them in a sufficiency of boiling water, and then concentrate the solution over the vapour bath to a proper consistence for making lozenges). For allaying tickling cough caused by irritation of the fauces.

GOSSYPIUM, E. *Raw Cotton.* Hairs attached to the seeds of *Gossypium herbaceum*. A native of Asia, and extensively cultivated in America; belonging to the Natural Family *Malvaceæ*, and to the Linnæan class and order *Monadelphica Polyandria*.

BOTANICAL CHARACTERS.—Stem, 3 to 12 feet high; Leaves, hoary, palmate, acutely

lobed ; Flowers, yellow, with a large purple spot at the base of each petal ; Capsules, ovate, pointed, about the size of a walnut ; Seeds, numerous, imbedded in down, which constitutes the cotton.

PHYSICAL PROPERTIES.—Cotton is in filamentous masses, each filament examined by the microscope is a flattened tube twisted on itself ; it is of a pale yellowish-white colour, tasteless and destitute of smell.

CHEMICAL PROPERTIES.—Cotton is a modification of *lignin* ; it is highly combustible, and is completely insoluble in water, alcohol, ether, the fixed and volatile oils, and all the vegetable acids.

THERAPEUTICAL EFFECTS.—The only medicinal use made of cotton is in the treatment of blistered surfaces and of burns ; it is applied in all stages of the latter, the earlier the better, but if any blisters be present, they should be first opened. The most convenient form for its application is that which is technically known as *French wadding*, and which is prepared for milliners ; this should be applied in successive layers, the unstarched side next the burn, so as completely to exclude the air ; it should not be removed for five or six days if possible, and then only the outer layers. Some surgeons use a spirituous or turpentine wash in extensive burns before applying the cotton.

If raw cotton be steeped for a few minutes in a mixture of strong nitric and concentrated sulphuric acid, squeezed, thoroughly washed, and dried very cautiously at a low temperature, certainly not higher than 200°, it is converted into *Gun-cotton*, the *Xyloidine* of chemists, a substance highly explosive and of peculiar properties. This gun-cotton dissolved in sulphuric ether constitutes *Collodium*, an adhesive compound that has been proposed for the re-union of recent incised wounds. It is applied in layers by means of a camel's-hair-brush, and drying instantaneously by the evaporation of the ether ; a thick coating may be given to any part of the body. Its effects depend on its keeping the opposed surfaces in close contact and preserving them from the air. With the latter view it has also been used in the treatment of some diseases of the skin and of burns, but it is now rarely employed for any of these purposes, experience having proved that its application does not fulfil the expectations of advantage held out by those who first proposed its adoption.

GUMMI ACACIE, E. ACACIA, L. ACACIA VERA, GUMMI, D. *Gum of various species of Acacia, E.—of Acacia vera, L.—of Acacia vera ; the true white gum-arabic is yielded by Acacia verek (Guillemin) ; other species contribute to furnish the gum arabic of commerce, D.—Gum-arabic ; Gum acacia.*—The species of the genus *Acacia* which yield gum are inhabitants of Arabia, Egypt, and Senegal ; they belong to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Polygamia Monœcia*. According to the

observations of Guillemain and Perettet, the statement of the Dublin College is incorrect, for they assert that the *Acacia verek* yields white Senegal gum.

BOTANICAL CHARACTERS.—Small thorny trees; Leaves, pinnated; Leaflets, linear, 8 to 20 pairs; Flowers, capitate, small, yellow.

PREPARATION.—Gum exudes from the trees either through natural fissures in the bark, or through artificial incisions made into it in the hot season of July and August; it flows in the form of a thick, viscid fluid, which concretes on the tree without losing its transparency; that which flows early in the season is gathered in December, and that which flows later, in March; the first gathering is considered the best.

PHYSICAL PROPERTIES.—Several varieties of gum acacia are met with in commerce; the most commonly known are *Turkey, or true Gum Arabic, Barbary Gum, Senegal Gum, East India Gum, and Cape Gum*. Gum arabic occurs in tears or irregularly shaped pieces, varying in size from a pea to that of a chestnut; it is transparent and brittle, but not readily reducible to fine powder; it has a vitreous fracture, and a pale reddish-yellow or pure white colour. It is inodorous; and has a weak mucilaginous taste. Its specific gravity varies from 1.335 to 1.525. The most transparent and whitest tears are picked out and sold as *picked gum, or gum of first quality*. The other varieties of gum do not differ essentially from gum arabic; they are usually in larger sized pieces, and of a darker colour; they are inferior in quality to gum arabic, and should not be used for medical purposes.

CHEMICAL PROPERTIES.—Gum arabic consists of 79.4 per cent. of soluble gum (*arabin*), and 17.6 per cent. of water. Some of the inferior sorts of gum contain a large quantity of insoluble gum (*bassorin*). Its ultimate analysis is $C^{12}H^{11}O^{11}$. Gum is soluble in its own weight of cold or boiling water, forming a viscid solution (*mucilage*); it is also soluble in vegetable acids; but is insoluble in alcohol, ether, and the fixed or volatile oils. By exposure to heat the water it contains is driven off; but it cannot be fused. Its solution in water reddens litmus paper faintly.

Adulterations.—The finer qualities of gum arabic are adulterated with the inferior, and these again with the other sorts; but the picked gum ought alone to be used in medicine.

THERAPEUTICAL EFFECTS.—Gum is nutritive, emollient, and demulcent. It is employed in inflammation of the mucous membranes, in gastric irritation, in acrid poisoning, &c. Its chief uses are as a vehicle for more active medicines, for suspending insoluble substances in water, and as a basis for pills in extemporaneous prescriptions. A strong solution has been proposed by Mr. Rhind of Edinburgh, as an application to burns, and in some cases in which I tried it, the pain was much alleviated, and when applied immediately after the accident, the formation of blisters was prevented. Thick mucilage dropped into the eye removes the annoyance occasioned by the presence of fine sand or dust in that organ. Mucilage is extensively used in pharmacy for the extemporaneous preparation of pills and for compounding mixtures and emulsions. Pills made

with mucilage become hard very speedily, and therefore it should not be employed as an excipient in their preparation unless when they are to be used immediately.

DOSE AND MODE OF ADMINISTRATION.—In substance or powder, ʒss. to ʒj., allowed to dissolve slowly in the mouth, in irritation of the fauces and in tickling cough.—*Mistura Acaciæ*, D. L. (“Take of gum arabic, four ounces; water, six ounces: dissolve the gum in the water with occasional stirring, then strain through flannel,” D.—“Acacia, powdered, ʒx.; boiling water, Oj.; rub the gum with the water gradually poured in, and dissolve it,” L.).—*Mucilago*, E. (Gum arabic, ʒix.; cold water, Oj.; mix, dissolve without heat, but with occasional stirring, and strain through linen or calico). Mucilage made with cold water, as directed by the Dublin and Edinburgh Colleges, keeps best; the quantity of gum employed in the Dublin formula is too much. The following proportions of mucilage are required to render different substances miscible with aqueous vehicles, according to the observations of Dr. Montgomery: “Oils require about three-fourths of their weight, balsams and spermaceti equal parts, resin two parts, and musk five times its weight.”—*Mistura Acaciæ*, E. (Mucilage, fʒiij.; sweet almonds, ʒx., pure sugar, ʒv.; water, Oj.; blanch the almonds, beat them to a smooth pulp in an earthenware or marble mortar, first with the sugar, and then with the mucilage; add the water gradually, stirring constantly; strain through linen or calico). Used for the same purposes as almond mixture, (see page 202).—*Trochisci Acaciæ*, E. (Gum arabic, ʒiv.; starch, ʒj.; pure sugar, lbj.; mix, and pulverise them; and make into a proper mass with rose-water for forming lozenges). For cough, hoarseness, and irritation of the fauces.

INCOMPATIBLES.—Alcohol, and consequently all tinctures; ether; ammonia; acetate of lead; borax; and the mineral acids.

HEMIDESMUS INDICUS, D. *The root of Hemidesmus Indicus; Indian sarsaparilla.* The root of this plant has, within the last ten or twelve years, been employed in medicine in the British isles, under the name of *Smilax aspera*. It is a native of the Indian peninsula; and belongs to the Natural family *Asclepiadaceæ*.

BOTANICAL CHARACTERS.—Roots, long, cylindrical; Stems, twining, woody, slender; Leaves, opposite, entire, glaucous, on short footstalks; Flowers, small, greenish-purple, in axillary racemes.

PHYSICAL AND CHEMICAL PROPERTIES.—As usually met with, the roots are from 10 to 12 inches in length, and vary in thickness from that of a goose-quill to that of the little finger. They consist of a reddish-brown corrugated epidermis, a yellow inner bark, from a line to a line and a half thick, and a paler coloured woody centre or medullium; the bark splits transversely into rings, between which the medullium is seen. Indian sarsaparilla has a very agree-

able odour resembling that of the *Tonquin bean*, and a sweetish mucilaginous taste. It has not been accurately analysed, but Mr. Garden of London obtained from it a volatile crystallizable acid, which he has named *smilasperic* (*hemidesmic*? Pereira) acid, and on which its fragrant odour depends. It imparts both odour and taste to boiling water.

THERAPEUTICAL EFFECTS.—Although this root is highly esteemed in India as a diaphoretic and tonic, and is used there extensively as a substitute for sarsaparilla, it has been only employed in this country for preparing a demulcent syrup, which, chiefly in consequence of its agreeable flavour, is employed as a vehicle for more active medicines.

DOSE AND MODE OF ADMINISTRATION.—An infusion, prepared by infusing ʒij. of the root in a pint of water, is employed in India. The dose of it is from fʒij. to fʒiv.—*Syrupus Hemidesmi*, D. (Take of Indian sarsaparilla, bruised, four ounces; boiling distilled water, one pint; refined sugar, in powder, as much as is sufficient: infuse the sarsaparilla in the water for four hours, in a covered vessel, and strain; set it by until the sediment subsides, then decant the clear liquor, and, having added to it twice its weight of sugar, dissolve with the aid of a steam or water heat). Mr. Jacob Bell of London proposed the following method for preparing this syrup, which, in consequence of the excellence of the product obtained thereby, is inserted here at length:—Root of hemidesmus Indicus, ʒxvj.; refined sugar, lbj.; distilled water, Oij.; bruise the root sufficiently to separate the bark by sifting, and reject the wood; add to the bark an equal bulk of washed sand; moisten with water (three or four ounces), so as to insure its intimate mixture, and pack it well in a displacement apparatus; add as much water as it will absorb; macerate for four hours, and displace the liquor by the addition of a further portion of water; reserve the first six ounces; add more water till it passes through tasteless, then evaporate the latter portion to three ounces, in which, with the addition of the first six ounces, dissolve the sugar with as moderate a heat as possible. Dose, fʒj. to fʒij.

HORDEUM, L. E. HORDEUM DISTICHUM, SEMINA DECORTICATA, D. *Pearl-barley*; *The decorticated seeds of Hordeum distichum*. A native of Tartary, now cultivated extensively in Europe; belonging to the Natural family *Graminaceæ*, and to the Linnæan class and order *Triandria Digynia*.

BOTANICAL CHARACTERS.—Stem, 3 to 4 feet high, glaucous, furrowed; Leaves, alternate, lanceolate, acute; Flowers, terminal, in close spikes, with long serrated awns.

PREPARATION.—Pearl-barley is prepared in a mill of a peculiar construction, by which, after it has been deprived of its husk, it is rounded and polished.

PHYSICAL PROPERTIES.—Small spherical grains, white, smooth,

still retaining a trace of the longitudinal furrow of the seed; they are odourless, but have a mild, sweetish, mucilaginous taste.

CHEMICAL PROPERTIES.—Pearl-barley is composed of fecula, uncrystallizable sugar, gum, gluten, albumen, lignin, &c. Proust has indicated the presence of a peculiar principle in barley meal which he has named *hordein*, but Dr. Thomas Thomson states, that it is merely a variety of *amylin*. According to Einhoff's analysis it contains 60 per cent. of starch, 5.3 per cent. of sugar, 5 of albumen, and 1 of gluten. Pearl-barley yields its mucilaginous principles to boiling water; the decoction contains much starch, as shown by the action of iodine on it when cool.

THERAPEUTICAL EFFECTS.—Pearl-barley is employed in medicine in the form of decoction, as an emollient and demulcent drink in febrile and inflammatory affections, as a vehicle for other remedies, and to give bulk to enemata.

DOSE AND MODE OF ADMINISTRATION.—*Mucilago Hordei*, D. (Take of ground pearl-barley, half an ounce; water, 16 ounces. Triturate the barley with the water gradually added, then boil for a few minutes).—*Decoctum Hordei*, D. L. (Pearl-barley, ʒiiss. (ʒiiss. L.); water, Oiss. (Oivss., L.); wash the barley in cold water, (then boil for a short time with Oss. of the water, L.), reject the washings, and then boil for twenty minutes (with the remainder of the water to one-half, L.), in a covered vessel, and strain).—*Decoctum Hordei compositum*, L. (Decoction of barley, Oij.; raisins; figs, sliced, of each, ʒiiss.; liquorice root, sliced and bruised, ʒv. Add a pint of water, boil down to Oij. and strain).—*Mistura Hordei*, E. (Pearl-barley; figs, sliced; and raisins, stoned, of each, ʒiiss.; liquorice root, sliced and bruised, ʒv.; water, Ovss.; clean the barley if necessary, by washing it with cold water; boil it with Oivss. of the water down to Oij.; add the figs, raisins, and liquorice root, with the rest of the water; boil down again to Oij.; then strain). These preparations may be employed indiscriminately for the purposes above stated.

LINI SEMINA, L. E. **LINUM USITATISSIMUM**, SEMINA, D. *Linseed; the seeds of Linum usitatissimum; the common Flax.*

LINI OLEUM, D. L. E. *Linseed oil, obtained from the seeds by expression.*

LINI FARINA, E. *Linseed meal, deprived of fixed oil by expression.*

The common flax, *Linum usitatissimum*, is an indigenous plant; belonging to the Natural family *Linaceæ*, and to the Linnæan class and order *Pentandria Pentagynia*.

BOTANICAL CHARACTERS.—Stem, a foot to a foot and a-half high, slender, branched above; Leaves, distant; Flowers, large, purplish-blue; Capsule, globular, ten-seeded.

PREPARATION.—The seeds are threshed out of the plant when fully ripe; and the oil is obtained from them by pressure without heat.

PHYSICAL PROPERTIES.—The seeds are ovate, pointed, about a

line in length, smooth and shining; they are reddish-brown externally, whitish within; they have an oily taste, but are inodorous. The oil is thick, of a wine-yellow colour, with a faint disagreeable odour, and a mild, somewhat nauseous taste. Specific gravity, .932. As met with in commerce, it is expressed with the aid of heat, when the colour is rather deeper. The seeds yield about 20 per cent. of oil.

CHEMICAL PROPERTIES.—The seeds consist of vegetable mucus containing free acetic acid and some salts, extractive, starch, wax, soft resin, gum, albumen, yellow colouring matter, and fixed oil, (*Meyer*). The mucilage exists in the tegument, the fixed oil in the nucleus. Linseed oil is composed of *oleic* and *margaric* acids, combined in equal equivalents with *acroleine*, (SACC); it dissolves in 5 times its weight of boiling alcohol, in 40 times its weight of cold alcohol, and in about one part and a-half of ether. At a temperature of -17° it congeals into a solid yellow mass; exposed to the air it concretes into a transparent varnish, and consequently is called in the arts, *a drying oil*.

THERAPEUTICAL EFFECTS.—Linseed and its oil are emollient and demulcent. An infusion of the seeds is sometimes employed internally in dysentery and diarrhoea, and in bronchial affections; it is also used as an emollient enema. Externally, the seeds reduced to powder, *linseed-meal*, are employed to prepare poultices and cataplasms; the oil mixed with lime-water is used as an application to recent burns.

DOSE AND MODE OF ADMINISTRATION.—*Decoctum (Infusum, L.) Lini compositum*, D. L. *Infusum Lini*, E. (Linseed, (bruised, L.), $\bar{3}j$. ($3vj$., L. E.); liquorice root, bruised, $\bar{3}ss$. ($3ij$., L. E.); water, (boiling, L. E.), Oiss. (Oj., L. E.); “boil for ten minutes in a covered vessel and strain while hot,” D. “Digest for four hours, near the fire, in a covered vessel, and strain (through linen or calico, E.)” L. E.). *Linseed Tea*, the best form for internal use, it may be sweetened with honey which increases its emollient properties; Dose, $\bar{f}3ij$. to $\bar{f}3iv$.—*Linimentum Calcis*, D. E. (Lime water; and linseed oil (olive oil, D.), of each, $\bar{f}3ij$.; mix and agitate them well together). This compound is commonly known by the name of *Carron oil*; it is an excellent application to recent scalds and burns.—*Cataplasma Lini*, L. (Boiling water, Oj.; bruised linseed, sufficient to make it of a proper consistence).

INCOMPATIBLES.—Preparations of lead and iron, and probably most metallic salts are incompatible with infusion of linseed.

MALVA, L. E. *Herb of Malva sylvestris*; *Common Mallow*. Indigenous; belonging to the Natural family *Malvaceæ*, and to the Linnæan class and order *Monadelphia Polyandria*.

BOTANICAL CHARACTERS.—Root perennial, tapering; Stem, two to five feet high,

branched ; Leaves on long petioles, five to seven lobed ; Flowers, large, three or four together, axillary, of a purplish-rose colour.

PREPARATION.—The herb should be gathered when in full flower.

PROPERTIES.—The entire plant is employed ; it is odourless and insipid ; every part of it abounds in mucilage, which it yields to boiling water. An infusion of the fresh flowers is an excellent chemical test for acids and alkalies, being changed to red by the former, and to green by the latter.

THERAPEUTICAL EFFECTS.—A simple emollient : it is employed in the same cases as the other remedies of this class, but at present is not much used.

DOSE AND MODE OF ADMINISTRATION.—*Decoctum Malvæ compositum*, L. (Mallow, dried, ʒj. ; chamomile, dried, ʒss. ; water, Oj. ; boil for a quarter of an hour and strain). Dose, fʒiv. to fʒvj. ; chiefly used for fomentations, and in enemata.

MARANTA, D. L. E. *Fecula of the tubers (rootstalk, L.) of Maranta arundinacea*, D. L. E.—and of *Maranta Indica*, D. E. *Arrow-root*. *Maranta arundinacea* is a native of the West Indies, it is extensively cultivated in Jamaica ; *Maranta Indica* is a native of the East Indies, and has been introduced into the Dublin and Edinburgh Pharmacopœias, as it is supposed to yield some of the East Indian arrow-root. They belong to the Natural family *Marantaceæ*, and to the Linnæan class and order *Monandria Monogynia*.

BOTANICAL CHARACTERS.—The rhizome is white, tuberous, and jointed, running horizontally in the ground, sending down many tuberous rootlets (*stoles*), about the thickness of a quill, covered with scales ; Stem, 2 to 3 feet high ; Leaves, ovate, lanceolate, alternate, with long, leafy, hairy sheaths ; Flowers, small, white.

PREPARATION.—Arrow-root is the fecula of the *stoles* ; it is procured from them when they are twelve months old ; they are then dug up, cleansed, and reduced to a state of pulp in wooden mortars ; the pulp is agitated with water, the fibres removed with the hand, the milky liquor passed through a fine hair-sieve, and allowed to settle, when it deposits the arrow-root, which is again washed with cold water, and finally dried in the sun.

PHYSICAL PROPERTIES.—*West Indian Arrow-root*, which is the most prized, is in the form of a very white powder, often aggregated into small irregular masses, crackling between the fingers, inodorous and tasteless. Examined by the microscope it is seen, like the other varieties of fecula, to consist of small elliptical grains, varying in size from a 2000th to a 750th of an inch in their longest diameter.

CHEMICAL PROPERTIES.—Its composition is $C^6H^5O^5$. In all other respects it resembles wheaten starch already described, but the jelly which it forms with boiling water is much more consistent ; according to the observations of Hayne, with equal quantities of boiling water, the jelly formed by 9 parts of arrow-root is as firm as that formed by 14 of wheaten starch.

Adulterations.—A great many varieties of fecula, known in commerce as Brazilian arrow-root, East Indian arrow-root, &c. but especially that obtained from the potato, *potato-starch*, are commonly sold for the true West Indian arrow-root. The fraud is best detected by the microscope; the grains, of which the true arrow-root is composed, being much more minute than those of any of the other varieties.

THERAPEUTICAL EFFECTS.—Arrow-root is rather an article of mild nutritious diet for the invalid than a medicine. It is particularly valuable in consequence of its emollient properties in diseases of the digestive organs; it is also an excellent nutriment for infants and young children.

DOSE AND MODE OF ADMINISTRATION.—A table-spoonful is sufficient to form a stiff jelly with a pint of boiling water or milk; to prepare it for use, the arrow-root should be first blended with a small quantity of the fluid, the remainder then added, care being taken that it is boiling, and the whole then gently heated for a few minutes; it is usually flavoured with lemon-peel, sugar, &c. Arrow-root milk and arrow-root pudding are made like the corresponding preparations of sago, (*which see*).

OLIVÆ OLEUM. *Olive oil* (described in the division *Cathartics*), acts also as an emollient; internally it is only employed as such in cases of irritant poisoning; as an external agent it enters into the composition of emollient ointments, liniments, &c.—*Unguentum simplex*, E. (Olive oil, ℥vss.; white wax, ʒij.; melt the wax in the oil, and stir the mixture briskly while it concretes in cooling). A mild dressing.—*Linimentum Calcis*, D. See page 216.

OVUM, L. E. *The egg of Phasianus Gallus, the domestic fowl. Phasianus Gallus* (*Gallus domesticus, Temminck*), belongs to the class *Aves*, order *Gallinæ*. Eggs are a mild and nutritious article of diet, and as such are frequently used in the sick-room. The white, or *albumen*, is employed as an antidote in poisoning with corrosive sublimate, or with the salts of copper; it is also useful in all cases of irritant poisoning. The yolk is employed in pharmacy for suspending camphor, oils, resins, &c. in aqueous vehicles.

SACCHARUM COMMUNE, E. SACCHARUM OFFICINARUM, D. *Brown sugar, D.; Raw sugar; Muscovado.*

SACCHARUM PURIFICATUM, D. SACCHARUM, L. SACCHARUM PURUM, E. *Pure sugar; White or refined sugar.*

THERIACA, D. SACCHARI FÆX, L. E. *Molasses; Treacle; or*

the concentrated uncrystallized juice of *Saccharum officinarum*, D. The sugar cane, *Saccharum officinarum*, is extensively cultivated in both the East and West Indies; it belongs to the Natural family *Graminaceæ*, and to the Linnæan class and order *Triandria Digynia*.

BOTANICAL CHARACTERS.—Stem, solid, juicy, from 6 to 12 feet high, coloured; Leaves, flat, in two rows, sheathing at the base; Flowers, triandrous, in a terminal panicle from 2 to 4 feet long, of a silver-grey colour from the long soft hairs that surround the flower.

PREPARATION.—The canes, when ripe, are cut off close to the ground, and the juice expressed from them by pressure between rollers; milk of lime is immediately added to the liquor, and the mixture gently heated, to saturate any acid present and to remove the herbaceous matter. The clear liquor is then drawn off, evaporated to a proper consistence in copper boilers, and allowed to cool in large wooden vessels, in which the impure sugar is deposited in coarse brown grains; this constitutes *raw sugar* or *muscovado*. The syrupy liquor, which does not crystallize, constitutes *molasses* or *treacle*. Raw sugar is refined in England; it is first dissolved in a small quantity of water by the aid of steam, heated for a short time with bullocks' blood, or with hydrate of alumina, which clarifies the syrup; it is then strained to remove the impurities, and filtered through a thick layer of animal charcoal; the clear liquor is next evaporated by steam heat in copper vessels placed in a partial vacuum, to a proper consistence, and poured into conical moulds; as soon as it becomes solid in the moulds, they are put to drain, and a solution of pure syrup, or a mixture of clay and water, poured over the base of each loaf; which, as it gradually percolates through the sugar, removes any impurities. These loaves constitute *loaf-sugar*, *refined sugar*, or *pure sugar*.

PHYSICAL PROPERTIES.—The physical properties of the different varieties of sugar are too well known to need description. The specific gravity of crystallized white sugar is 1.6.

CHEMICAL PROPERTIES.—Sugar is permanent in the air, exposed to heat it melts, becomes brown, and emits a peculiar odour; it is inflammable, burning with a white flame; it is soluble in two parts of water at 60°, and to any extent in boiling water; it is soluble in 80 parts of absolute alcohol at the boiling temperature, very slightly in the same when cold, and in about 5 parts of rectified spirit; it is much more soluble in proof spirit; it is wholly insoluble in ether, which precipitates it from its solutions. In the crystalline state, cane sugar is composed of $C^{12} H^9 O^9 + 2HO$. Treacle consists principally of uncrystallizable sugar, gummy extractive, and a small quantity of water, which it retains with so great tenacity, that if left exposed to the air, even for a very long period, it does not become drier, or lose weight.

Adulterations.—The inferior raw sugars frequently contain sand, which is left when the sugar is dissolved in water; white sugar is said to be adulterated with lime and gum; the former is detected by oxalic acid, the latter by diacetate of lead, producing white precipitates in a solution. Raw cane sugar is in the present day commonly adulterated with grape sugar, a fraud of much importance, in consequence of the inferior sweetening powers of the latter. That variety of it obtained from potatoes—*potato sugar*—is generally used for this purpose. It may be detected by the following simple but beautiful test of Trommer: "Dissolve the specimen in water,

add sufficient solution of sulphate of copper to colour the liquid blue, then a large excess of solution of caustic potash; the blue precipitate at first thrown down is re-dissolved with an intense purplish-blue colour by the excess of alkali. On heating the liquid now to the boiling point, if there be no grape sugar present, it undergoes but little change; but if it contain any of that article, a precipitate of brilliant red sub-oxide of copper is thrown down, copious in proportion to the quantity of grape-sugar present."

THERAPEUTICAL EFFECTS.—Sugar is highly nutritious, but as an article of diet it is rather employed for its agreeable sweetness. As a medicine it is emollient and demulcent, and as such, is used in coughs, and in irritant poisoning. In pharmacy it is in very general use as a flavouring ingredient, and to give bulk and consistence to powders, pills, conserves, electuaries, lozenges, syrups, &c.

DOSE AND MODE OF ADMINISTRATION.—*Syrupus*, L. *Syrupus simplex*, D. E. ("Take of refined sugar, in powder, five pounds; distilled water, two pints. Dissolve the sugar in the water, with the aid of a steam or water heat. The specific gravity of this syrup is 1330," D.—"Pure sugar, lbx.; water, Oijj.; dissolve the sugar in the water with the aid of a gentle heat," L. E.). As a flavouring adjunct to mixtures, and to suspend insoluble substances in aqueous vehicles.

SACCHARUM LACTIS, D. *Sugar of milk. Lactine.*

PREPARATION.—An article of the *Materia Medica* introduced into the last edition of the *Dublin Pharmacopœia*. It is prepared by evaporating whey to a syrupy state, and setting aside to cool, when the lactine crystallizes slowly. The crystals may be purified by means of animal charcoal.

PHYSICAL PROPERTIES.—It occurs in white, translucent, small square prisms, of great hardness. They feel gritty under the teeth, have a faint sweetish taste, but a strong solution in water tastes much more sweet.

CHEMICAL PROPERTIES.—The composition of crystallized sugar of milk is $C^{24} H^{19} O^{19} + 5HO$. It dissolves very slowly in cold water, requiring 5 or 6 times its weight; it is soluble in twice and a-half its weight of boiling water. Heated it loses water, turns black and is decomposed. Milk sugar may be converted into grape sugar by boiling with the dilute mineral acids.

THERAPEUTICAL EFFECTS.—Sugar of milk is only used in medicine as an excipient for active substances or for heavy powders, such as calomel, &c. It is almost exclusively employed for this purpose by the Homeöpathists.

SAGO, D. L. E.—*The farina from the interior of the trunk of*

Cycas circinalis ; also obtained from other species of *Cycas* and various *Palmaceæ*, D. *Fecula* of the pith of *Sagus Rumphii*, L. *Farina* from the interior of the trunk of various *Palmaceæ* and species of *Cycas*, E. *Sago*. Various species of the palm tribe have been ascertained as sources of the sago of commerce ; the finest is procured from *Sagus farinifera*, and *Sagus genuina*, trees which form immense forests on nearly all the Moluccas, and which are so rich in starch that a single tree is reckoned to yield from 600 to 800lbs of sago. Some is also obtained from the *Sagus Rumphii*, a native of Malacca and the Malay islands, and from the *Saguerus Rumphii*, which inhabits the islands eastward to the Bay of Bengal ; it is also procured from the *Cycas circinalis* and *revoluta*, from the *Areca ole-racea*, the *Phoenix farinifera*, the *Arenga saccharifera*, &c. They are all lofty trees, belonging to the Natural family *Palmaceæ*, and to the Linnæan class and order *Monœcia Hexandria*.

PREPARATION.—The tree being cut down, the pith is removed, reduced to powder, and the fecula separated from the woody fibre by repeated washings with water over a hair-sieve ; when the milky liquor, which passes through, is allowed to settle, it deposits the sago in the form of a fine powder, which is afterwards granulated by a process with which we are not acquainted.

PHYSICAL PROPERTIES.—Sago occurs in the form of a fine powder (*Sago Meal*), or in pearly grains (*pearl sago*) ; both sorts have a pinkish-yellow tint, a faint musty odour, but no taste. The grains of pearl sago vary in size from a pin's head to that of a pea ; the small variety is most esteemed, the larger sort is known as *common* or *brown sago*.

CHEMICAL PROPERTIES.—In its chemical properties, sago resembles the other varieties of starch ; but it does not form so firm a jelly with water as arrow-root : as seen under the microscope, its globules are larger than those of arrow-root, but smaller than those of potato-starch.

THERAPEUTICAL EFFECTS.—As an article of diet for the sick room, sago is much inferior to arrow-root or tapioca, consequently it is not much used in the present day. The jelly may be prepared with it in the same manner as with arrow-root. *Sago milk*, THOMSON, (Sago, 3j. ; cold water, Oj. ; soak the sago in the water for an hour, pour off the water, and add of new milk, Oiss. ; and boil slowly until it is well incorporated). It may be flavoured with sugar, nutmeg, or cinnamon, or white wine, according to circumstances.—*Sago pudding*, THOMSON, (Beat the yolks of two eggs and half an ounce of sugar together, and stir the mixture into a pint of sago milk).

SALEP.—*The dried root of Orchis mascula* ; an indigenous plant belonging to the Natural family *Orchidaceæ*, and to the Linnæan class and order *Gynandria Monandria*.

By grinding the dried roots of this and of other species of the genera *Orchis* and *Eulophia*, a nutritious substance is procured, which, although highly esteemed by the ancients, and in modern times in the East, is but little employed in the present day amongst Europeans. It contains a large quantity of gum, insoluble in cold, but soluble in boiling water (*bassorin*), and a trace of fecula. A mucilage formed by boiling 3ss. of it in Oj. of water, forms a nutritious and useful article of diet for the sick. In Turkey, where salep enjoys a high reputation as a corroborant in affections of the bowels and respiratory organs, the dried root is ground by means of handmills to a fine powder, then stirred up with water, and boiled into a stiff jelly, which is sweetened with honey.

SAMBUCUS NIGRA.—The flowers of the common elder, *Sambucus nigra*, are officinal in the London and Edinburgh pharmacopœias. It is a small indigenous tree, belonging to the Natural family *Caprifoliaceæ*, and to the Linnæan class and order *Pentandria Digynia*. A distilled water, an oil, and an ointment are directed to be prepared from them, all of which possess an agreeable odour and mildly emollient properties.—*Aqua Sambuci*, L. E.—*Elder-flower water*. (Elder flowers, ℔x. (or oil of elder, f3ij., L.); proof (rectified, E.) spirit, f3vij. (f3iij, E.); water, cong. ij.; mix, and distil a gallon).—*Oleum Sambuci*, L. (To be prepared from elder flowers according to the general directions for volatile oils; see p. 176).—*Unguentum Sambuci*, L. (Elder flowers; and lard, of each, ℔ij.; boil the elder flowers in the lard till they become crisp, and press through a linen cloth).

TAPIOCA, D. E.—*Fecula of the root of Janipha Manihot* (*Manihot utilisima*, POHL); *Mandioc plant. Tapioca*. A native of Brazil; belonging to the Natural family *Euphorbiaceæ*, and to the Linnæan class and order *Monœcia Monadelpia*.

BOTANICAL CHARACTERS.—Root, large, thick, juicy; Stem about 6 feet high; shrubby; Leaves, palmate, 5-7 parted; Flowers, axillary, racemose.

PREPARATION.—The root, which consists of woody fibre, a bland fecula, and a highly acrid, poisonous, milky juice, is reduced to a pulpy mass, washed and pressed on mat-sieves; the milky liquor, with the fecula suspended in it, passes through, and on settling deposits the fecula, which is repeatedly washed with water to free it from the poisonous juice, and finally dried on hot plates; the marc is afterwards dried on iron plates over a fire, when it constitutes *Cassava bread*.

PHYSICAL PROPERTIES.—Tapioca occurs in irregularly shaped, rugged fragments, about the size of a small nut; white with a pinkish hue, inodorous and tasteless. Like the other feculas, as seen under the microscope, it consists of small globules very uniform in size, and being nearly as small as the smallest globules of arrow-root.

CHEMICAL PROPERTIES.—It is similar to the other varieties of fecula, and is a very fine form of starch.

THERAPEUTICAL EFFECTS.—Precisely similar to those of arrow-root; a jelly may be prepared in the same manner. Tapioca milk and Tapioca pudding are made in the same way as sago milk and sago pudding.

TRAGACANTHA, D. L. E. *Gummy exudation from Astragalus gummifer, D.—from Astragalus verus, L. and other species, E.* Several species of the genus *Astragalus* yield gum-tragacanth; they are natives of Asia Minor, Persia, and of the island of Crete. They are placed in the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and in the Linnæan class and order *Diadelphia Decandria*. The officinal tree of the Dublin College yields an inferior quality of gum, described by Guibourt as pseudo-gum tragacanth.

BOTANICAL CHARACTERS.—The *Astragalus verus*, which yields the finest gum-tragacanth of English commerce, is a small shrub, from 3 to 4 feet high, with spiny branches, pinnatifid leaves, and yellow papilionaceous flowers.

PREPARATION.—Tragacanth flows from natural fissures in the bark, and concretes rapidly when exposed to the air; it flows only during the hot season and in the night time.

PHYSICAL PROPERTIES.—Gum-tragacanth occurs in broad, thin plates of a white or citron yellow colour, semi-transparent, marked with concentric elevations. It is inodorous and tasteless, is hard and brittle, but with difficulty reduced to powder, unless heated to 100° or 120° F.

CHEMICAL PROPERTIES.—It is composed of 57 per cent. of soluble gum (*adragantine or arabin*), and 43 per cent. of gum insoluble in cold but soluble in boiling water (*bassorin*), (Bucholz). Gum-tragacanth forms a thicker mucilage with water than gum arabic, “one part giving more viscosity to water than 25 parts of gum arabic,” (Bucholz).

THERAPEUTICAL EFFECTS.—Similar to those of gum arabic, but not so generally employed.

DOSE AND MODE OF ADMINISTRATION.—Powder, 3ss. to ʒij.—*Pulvis Tragacanthæ compositus, L. E.* (Tragacanth, bruised; gum-arabic, bruised; and starch, of each, ʒiss.; pure sugar, ʒiij.; reduce the starch and sugar together to powder, add the tragacanth and gum arabic, and pulverise the mixture thoroughly). Generally used for administering calomel and other active and heavy powders to children; the dose as an emollient for adults, is ʒj. to ʒij.—*Mucilago Gummi Tragacanthæ, E.* (Tragacanth, powdered, ʒij.; boiling water, fʒix.; macerate for 24 hours, triturate to dissolve the gum, and strain). Used for the same purposes as mucilage of gum arabic.

TUSSILAGO, L. *The whole herb of Tussilago farfara; Coltsfoot.*

Indigenous; belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnæan class and order *Syngenesia Superflua*.

BOTANICAL CHARACTERS.—Root, creeping; Leaves, large, cordate, downy beneath; Flowers, *asteraceous*, yellow, appearing before the leaves.

PROPERTIES.—The dried herb is odourless, but has a mucilaginous, slightly bitter taste. It is chiefly composed of mucilage and bitter extractive. It yields its properties to boiling water.

THERAPEUTICAL EFFECTS.—Although coltsfoot was formerly highly esteemed as an emollient and demulcent in chronic bronchitis and in consumption, in the present day it is scarcely ever employed except in domestic practice. A decoction prepared by boiling ʒiiss. of the dried plant in Oiss. of water down to Oj. , may be given in doses of ʒiij. or ʒiij. repeatedly.

UVÆ PASSÆ, D. E. UVA, L. *The dried fruit of Vitis vinifera, (with the stones taken out, L.). Raisins.*

VITIS VINIFERA, FRUCTUS RECENS, D. *Grapes.* The grape-vine is generally cultivated throughout the greater part of the globe; it belongs to the Natural family *Vitaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—A hardy climbing shrub; Leaves, alternate, smooth, lobed; Flowers, very small, greenish, in pendant racemes opposite to the leaves; Fruit, a succulent globose berry, usually four-seeded.

PREPARATION.—To prepare raisins, grapes are generally merely dried in the sun, sometimes artificial heat is employed; and in many places the fruit is dipped in an alkaline ley before being dried.

PHYSICAL PROPERTIES.—Raisins are too well known to require description; two sorts widely different in appearance and flavour are commonly met with; the common raisin (*Passulæ Majores*), which alone is officinal; and dried currants (*Passulæ Minores*), which are the product of a small variety of vine, an inhabitant of Greece, especially the neighbourhood of Corinth, and of the islands of Zante and Cephalonia. Grapes and raisins are imported into the British islands chiefly from Spain, Portugal, and the Levant; Muscatel raisins are the finest.

CHEMICAL PROPERTIES.—Raisins consist of uncrystallizable sugar (*grape sugar*), mucilage, extractive, bitartrate of potash, malic and citric acids, &c.

THERAPEUTICAL EFFECTS.—Raisins are emollient, nutritive, and demulcent; they are only employed in medicine as flavouring adjuncts, for which purpose they form ingredients in many officinal preparations. Grapes are an agreeable cooling fruit for the sick room.

CHAPTER XII.

EPISPASTICS.

(Vesicants ; Rubefacients ; Counter-irritants ; Derivatives ; Revulsives.)

EPISPASTICS are substances which produce redness, inflammation, or vesication, when applied to the skin. They are employed in the practice of medicine principally with the intention of relieving or removing the diseased condition of some internal organ, by producing a new irritation or determination to the surface of the body, or to some remote part. Independently of this effect, however, blisters, which are the most important medicinal agents in this division, act also as general stimulants to the system, and as such, are frequently used with much benefit in the advanced stages of typhoid fevers, and in spasmodic affections arising from debility. This stimulant effect of blisters should be borne in mind, and consequently their application should be avoided in the very acute stages of inflammatory diseases, until the general excitement be previously subdued by antiphlogistic means. Epispastics are generally employed as near the seat of the disease as possible, unless when the intention is to produce a determination to some remote part of the body, as in the application of sinapisms to the feet in affections of the head. In the employment of any of the remedies contained in this class, in the diseases of infancy and childhood, it must be borne in mind that inflammation of the skin is much more readily produced in the young than in persons advanced in life, and consequently their effects must be carefully watched; this is more especially the case with reference to blisters (see, page 228).

AMMONIÆ LIQUOR FORTIOR, D. L. AMMONIÆ AQUA FORTIOR, E. *Stronger solution of ammonia.* (These preparations have been described in the divisions *Antacids* and *Caustics*). Applied to the surface of the body, the strong solution of ammonia produces redness and irritation, and if the application be long enough continued, it vesicates. Its only advantage as a blistering agent is that it operates speedily, on which account it is employed in inflammation suddenly attacking any of the abdominal viscera, as in retrocedent gout. In diseases of the urinary organs it should be preferred as a blistering agent to cantharides, in consequence of the irritant action of that

substance on the kidneys. As a counter-irritant it is frequently used to relieve internal inflammations; and as a rubefacient, it is employed in muscular or neuralgic pains. An immediate blister may be readily produced by pouring eight or ten drops of concentrated solution of ammonia on a piece of lint, and applying it to the skin with moderate pressure.—*Linimentum Ammoniae*, D. L. E. (Solution of ammonia (Dens. 960, E.), f3j.; olive oil, f3ij. (f3ij. L. E.); mix, with agitation). This preparation, so generally known as a domestic remedy by the name of *hartshorn and oil*, is an excellent counter-irritant much employed in inflammatory sore throat; it is usually applied on a piece of flannel. By increasing the quantity of ammonia, it produces more powerful effects.—*Linimentum Camphoræ compositum*, D. L. (“Take of camphor, five ounces; oil of lavender, two fluid drachms; rectified spirit, one pint and a half; stronger solution of ammonia, half a pint: dissolve the camphor and oil of lavender in the spirit, then add the solution of ammonia, and mix with agitation,” D.—“Camphor, 3iiss.; solution of ammonia, f3viiss.; spirit of lavender, Oj.; mix the solution of ammonia with the spirit, then let a pint distil from a glass retort with a slow fire; lastly, dissolve the camphor in it,” L.).—*Linimentum Ammoniae compositum*, E. (Stronger aqua ammonia (Dens. 880), f3v.; tincture of camphor, f3ij.; spirit of rosemary, f3j.; mix well together; this liniment may be also made weaker for some purposes with f3ij. of tincture of camphor and f3ij. of spirit of rosemary). These preparations are used for the same purposes as the liniment of ammonia; they are cleaner, more agreeable, and more efficacious.—*Linimentum Ammoniae sesquicarbonatis*, L. (Solution of sesquicarbonate of ammonia, f3j.; olive oil, f3ij.; shake together until they are well mixed). Its effects and uses are similar to those of *Linimentum Ammoniae*.—*Ammoniacal blistering ointment*, GONDRET. (Take of axunge, 3j.; oil of sweet almonds, f3ss.; melt together with a gentle heat; pour the mixture while still liquid into a wide-mouthed glass vessel; then add, water of caustic ammonia, f3v.; and mix with constant agitation till cold). In preparing this ointment, particular care must be taken that the axunge be merely melted; if it be too fluid or too warm, some of the ammonia will be vaporised and the resulting ointment too weak. It may be kept unchanged for many months, in stoppered glass bottles in a cool place. It is applied by spreading it on the skin, and covering the part with a compress; it vesicates in about ten minutes.

ANTIMONII ET POTASSÆ TARTRAS. *Tartar emetic* (described in the division *Diaphoretics*), applied by friction to the skin, produces a crop of pustules which ulcerate, and discharge purulent matter, causing thereby counter-irritant effects. With this intention, it is very frequently employed in various affections of the thoracic and abdominal viscera; in subacute inflammations of the brain or spinal cord and their membranes; in diseases of the joints; in muscular and

neuralgic pains, &c. It is usually applied in the form of ointment or saturated solution; or from gr. v. to gr. x., may be sprinkled over the surface of any simple plaster, and left on until it produces the desired effect.—*Unguentum Antimonii Tartarizati*, D. *Unguentum Antimonii Potassio-tartratis*, L. *Unguentum Antimoniale*, E. (Tartar emetic, in very fine powder, ʒj. (ʒj. L. E.); “ointment of white wax, ʒvij.,” D. “prepared hog’s-lard, ʒiv.” L. E.). The Dublin preparation is too weak; this ointment is employed by rubbing about half a drachm on the skin night and morning; in two or three days, pustules begin to appear, when the application of the ointment should be discontinued, as it sometimes gives rise to troublesome ulceration. The concentrated solution is applied by means of pledgets of linen soaked in it; its operation is more speedy than that of the ointment. Rollott has recently proposed a new method for producing counter-irritation with tartar emetic. He places a small quantity of it in very fine powder on a piece of glass, and makes it into a thick paste with a drop or two of oil or water. This he inserts with a lancet under the skin, in the same manner as vaccine matter, proportioning the number of punctures to the effect it is wished to produce.

AQUA FERVENS. Boiling water has been used to produce rapid and extensive vesication, as a means of rousing the system in narcotic poisoning; the difficulty of confining its action, the great pain caused by it, and the troublesome ulceration which it is apt to occasion, forbid its use except in extreme cases.

CANTHARIDES (described in the division *Diuretics*), are employed externally to produce rubefaction, vesication, or suppuration. The first of these effects is caused by the application of cantharides mixed with other substances to blunt their activity, as in the *Emplastrum calefaciens*, D., or by applying the active preparations for only a short space of time. To produce rubefaction we employ cantharides in the treatment of rheumatic and other local pains, in chronic catarrh, and in the habitual cough of the old and debilitated. When cantharides are left for some time closely applied to the surface of the skin, the cuticle is raised and serous fluid effused between it and the true skin, a blister being thus produced in a period varying with the preparation of the flies which is employed. No agent is so generally used to produce vesication as cantharides, in consequence of the certainty of their operation, the comparatively little pain which they occasion, and the facility with which they may be applied. Blisters are employed in a great variety of diseases, generally with the intention of relieving pain, inflammation, and congestion of internal organs; which they effect by derivation to the surface of the body, or as it is usually termed by counter-irritation. With this view, they

are applied in both the acute and chronic forms of inflammation of the brain and spinal cord, to the scalp, or along the track of the spinal marrow; in inflammatory affections of the thoracic and abdominal viscera, to the surface of the chest or abdomen; and in the local congestions of fevers, as near the affected part as possible. Blisters are also used to stimulate to increased action, as in indolent buboes, in chronic enlargement of the testicle, over chronic abscesses, to indolent ulcers, and in effusion into the joints. To excite the system generally, they are applied in the comatose stages of typhoid fever or pestilential cholera, and in apoplectic affections. To produce suppuration, cantharides are used in the form of ointment, as a dressing to parts from which the cuticle has been previously removed, and as powerful counter-irritants, are thus employed with much advantage in chronic inflammatory diseases, forming what is termed a perpetual blister. Cantharides should not be employed to produce vesication where any irritation or inflammation of the urinary organs is present, in consequence of their peculiar tendency to produce strangury. In infants and young children, blisters should be used with great caution, as they are liable to produce troublesome sloughing, which in many instances has caused death; as a general rule they should only be left on until redness of the surface is produced, when the application of a warm poultice to the part will cause vesication.

PHARMACEUTICAL PREPARATIONS.—*Emplastrum Cantharidis*, D.—“Take of Spanish flies, in very fine powder, six ounces; yellow wax; resin; prepared lard, of each, four ounces: to the wax, resin, and lard, previously melted together by a steam or water heat, add the Spanish flies, and stir the mixture constantly until the plaster is cool.” L.—“Cantharides, in very fine powder, lbj.; wax plaster, lbss.; lard, lbss.; sprinkle the cantharides in the plaster and lard melted together, and removed from the fire, a little before they concreate, and mix them all.” E.—“Cantharides, in very fine powder; wax; resin; and suet, of each, ʒij.; liquefy the fats, remove from the heat, sprinkle in the cantharides, and stir briskly as the mixture concretes on cooling.” This is the preparation most generally employed to produce a blister; it is spread on leather with a cold (*not heated*) spatula, and the margin covered with adhesive plaster to prevent its moving or falling off; blistering plaster, however, acts much better when spread on soft brown paper in a thin layer, in consequence of its being much more perfectly kept in close contact with the skin, which is effected by means of a bandage. In ordering blisters in prescriptions, it is usual to draw an outline with the pen of the size and shape which it is wished that they should be; but in some of the continental pharmacopœias, as in that of Hamburgh, prescribed forms are given for them. In order to prevent the irritant action of the cantharides on the urinary organs, in persons liable to such an effect, a piece of tissue paper oiled should be placed between the plaster and the skin. Blisters are usually left on from eight to twelve hours to produce their action; the raised cuticle should be then cut to allow the escape of the serum, and a dressing of spermaceti or some simple ointment applied.—*Emplastrum Calefaciens*, D. (“Take of plaster of Spanish flies, half a pound; Burgundy pitch, five pounds and a half: melt them together by means of a steam or water bath, and, withdrawing the heat, stir constantly until the mixture stiffens”). Rubefacient; its uses have been described above.—*Acetum Cantharidis*, D. L. E. (“Take of Spanish flies, in fine powder, four ounces; strong acetic acid, four fluid ounces; acetic acid of commerce (specific gravity, 1044), sixteen fluid ounces; mix the acids, and, having added the flies, macerate in a close vessel for fourteen days; then strain through flannel with expression, and filter so as to obtain a clear liquor.” D.—“Cantharides, in powder, ʒij.; acetic acid, Oj.; macerate for 8 days, frequently shaking; press, and strain,” L.—“Cantharides, in powder,

ʒij. ; acetic acid, fʒv. ; pyroligneous acid (dens. 1034), fʒxv. ; euphorbium, in coarse powder, ʒss. ; mix the acids, add the powders, macerate for 7 days, strain and express strongly, and filter the liquor," E.). Employed as an extemporaneous blister ; it may be conveniently applied with a piece of sponge ; it produces a blister in from 5 to 10 minutes. Complaints are frequently made of the inefficiency of this preparation ; this arises either from its being prepared with weak acid, or from its not being rubbed into the skin with sufficient care, as its application should be continued until it produces intense redness of the part and much pain.—*Linimentum Cantharidis*, D. ("Take of Spanish flies, in fine powder, three ounces ; olive oil, twelve fluid ounces : digest the flies in the oil for three hours, in a steam or water bath, and strain through flannel ; express the residuum and strain the oil thus obtained ; finally, mix both products"). A rubefacient liniment, which, if well rubbed in may be made to produce vesication. From its disagreeable odour and oily nature it is a dirty application, and I do not know on what grounds it was introduced into the last Dublin pharmacopœia. It is used for preparing the ointment of Spanish flies.—*Ceratum Cantharidis*, L. *Unguentum Cantharidis*, E. (Cantharides, in very fine powder, ʒj. ; spermaceti cerate (resinous ointment, E.), ʒvj. (ʒvj., E.) ; add the cantharides to the cerate (or ointment) softened by heat, and mix). Used to promote suppuration from blistered surfaces, but it is very apt to cause stranguery.—*Unguentum Cantharidis*, D. L. ("Take of liniment of Spanish flies, eight fluid ounces ; white wax, three ounces ; spermaceti, one ounce ; melt the wax and spermaceti in the oil, with a gentle heat, and stir the mixture constantly until it concretes," D.—"Cantharides, in very fine powder, ʒj. ; distilled water, fʒiv. ; cerate of resin, ʒiv. ; boil down the water with the cantharides to half, and strain ; mix the cerate with the strained liquor, then evaporate to a proper consistence," L.).—*Unguentum Infusi Cantharidis*, E. (Cantharides, in moderately fine powder ; resin ; and wax, of each, ʒj. ; Venice turpentine ; and axunge, of each, ʒij. ; boiling water, fʒv. ; infuse the cantharides in the water for a night, squeeze strongly, filter the liquid, add the axunge, and boil till the water is dispersed ; add the wax and resin ; and when these have melted, remove the vessel from the fire, add the turpentine, and mix the whole thoroughly). Used for the same purposes as the cerate, than which these preparations are somewhat milder.—*Emplastrum Cantharidis compositum*, E. (Venice turpentine, ʒivss. ; Burgundy pitch ; and cantharides, of each, ʒij. ; wax, ʒj. ; verdigris, ʒss. ; white mustard seed ; and black pepper, of each, ʒij. ; melt the wax, and Burgundy pitch, add the turpentine, and while the mixture is hot sprinkle into it the remaining articles previously in fine powder and mixed together ; stir the whole briskly as it concretes in cooling). A more certain blister than the simple *emplastrum cantharidis*, according to Duncan it is *infallible*.—*Blistering cloth*, P. (Oil of cantharides obtained by ether, 4 parts ; yellow wax, 8 parts ; melt with a very gentle heat, and spread on waxed linen or calico). A more elegant preparation than blistering plaster, and equally, if not more efficacious.—*Tela vesicatoria*, *Charta vesicatoria*, &c. ; so generally employed in the present day for blistering, are prepared in the same manner, paper being used instead of linen or calico.—*Papier d'Albespeyres*, now so generally used for keeping up a discharge from blistered surfaces, is prepared as follows :—No. 1. which is the weakest ; "White wax, 5 parts ; olive oil, 3 parts ; cocoa-nut oil, 4 parts ; spermaceti, 3 parts ; turpentine, 1 part ; cantharides, 1 part ; water, 8 parts ; all melted together."—No. 2. "White wax, 3¼ ; olive oil, 2½ ; cocoa-nut oil, 3 ; spermaceti, 2¼ ; turpentine, ¾ ; cantharides, 1 ; water, 8."—No. 3. the strongest, contains the same quantities of cantharides and water, and half the proportions of the other ingredients contained in No. 1. The compound is spread on paper, or on fine linen or calico.—*Æther Cantharidalis*, GÜTTINGER. (Cantharides, in coarse powder, 1 part ; sulphuric ether, 2 parts ; digest for three days and express). This preparation is an active vesicant ; mixed with equal parts of hog's-lard it forms an admirable preparation for blistering children, vesicating after two or three applications within two hours.—*Collodium Vesicans seu Cantharidale*, (Most readily prepared by mixing together equal parts of collodium and cantharidal ether). An elegant preparation, possessing the advantage that its strength can be easily increased or diminished. It is now much used for blistering, owing to its cleanliness, its certainty and the facility with which it may be applied in the neighbourhood of joints or to other parts of the body which it is difficult to blister by the ordinary method. It is applied with a camel's-hair-brush : two scruples are sufficient to blister a surface the size of the palm of the hand ; it is

preferable to apply the quantity to be used, twice instead of at once on the place to be blistered.

CAPSICUM, D. L. E. *The fruit of Capsicum annuum,—and of other species of Capsicum, E. Capsicum, or Chillies. Cayenne pepper.* The *Capsicum annuum* is a native of the East and West Indies, and of South America; it belongs to the Natural family *Solanaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—A herbaceous annual, 1-2 feet high; Leaves, ovate, smooth, placed on long footstalks in irregular order; Flowers, white, axillary, solitary; Fruit, a long conical, juiceless, scarlet or yellow berry, pendulous.

PREPARATION.—Cayenne pepper is prepared by reducing to a moderately fine powder, the dried fruit of this and of other species. It is often imported in powder, chiefly from the West Indies, in small gourds; but the greater part is ground at home, common salt, in the proportion of one-fourth, being generally mixed with it.

PHYSICAL PROPERTIES.—A moderately fine powder, of a reddish-yellow colour; with a faint aromatic odour, and a bitter, acrid, burning taste.

CHEMICAL PROPERTIES.—The active principles of Cayenne pepper depend on a very acrid oil which has been named *Capsicin*. It yields its virtues to water, alcohol, ether, acetic acid, and the fixed and volatile oils.

THERAPEUTICAL EFFECTS.—Cayenne pepper applied to the skin produces redness and inflammation, which is followed by vesication; if the application be continued for some time. As a rubefaciant, and even vesicant, it is much employed in the West Indies, but is scarcely ever used with either of these intentions in this country; nevertheless applied in the form of cataplasm, it is a convenient and effectual counter-irritant. Its use as a stimulant will be considered under that head.

CROTONIS TIGLI OLEUM, Croton oil (described in the division *Cathartics*), rubbed on the skin produces redness and inflammation of the part to which it is applied, which is followed by a copious pustular eruption. It is applicable to all cases in which we wish to produce speedy and active counter-irritation, but it should not be applied to the face or scalp, as in more than one instance I have seen it produce erysipelatous inflammation of these parts. Lafargue cures nævi by inoculation with croton oil; five or six punctures are made on and around the tumour with a lancet dipped in the oil, just as in vaccination. Each puncture immediately causes a pimple, which in 36 hours is developed into a little boil: these boils unite and form a hot painful tumour, covered with white crusts. Two days afterwards the scabs separate, and in lieu of the nævus is seen an ulcer which is to be treated on general principles. It would be dangerous to

make more than six punctures on a very young infant, as the irritation and fever are considerable.—*Linimentum Crotonis*, D. ("Take of croton oil, one fluid ounce; oil of turpentine, seven fluid ounces: mix them with agitation"). Olive oil or linseed oil may be substituted for the oil of turpentine should the odour be objectionable.—A plaster, prepared by melting with a gentle heat, four parts of diachylon plaster, and incorporating with it one part of croton oil, spread on calico, and applied to the surface of the body, will produce a pustular eruption in about 24 hours. It is a convenient and excellent way of employing this counter-irritant.

EUPHORBIA, L. E. *Gum-resin of Euphorbia officinarum*, L.—*Concrete resinous juice of undetermined species of Euphorbia*, E. *Euphorbium*. In Africa *Euphorbium* is procured from *Euphorbia officinarum* and from *Euphorbia antiquorum*; in the Canaries it is obtained from *Euphorbia canariensis*. The genus belongs to the Natural family *Euphorbiaceæ*, and to the Linnæan class and order *Monœcia Monandria*.

BOTANICAL CHARACTERS.—The pieces of the branches which we find mixed with the gum are 4 to 5 angled, with dark, shining spines, double. The genus is characterised by its monœcious heads of flowers surrounded by an involucre of one leaf with five divisions, including several barren flowers with one fertile; Capsule 3-seeded.

PREPARATION.—It is obtained in the neighbourhood of Mogadore, (from whence it is chiefly brought to this country), by making incisions into the stem and branches, from which a milky juice exudes; this juice concretes on the tree into a yellow gum, and is gathered when quite dry. So intensely acrid is the gum, that those who gather it are obliged to tie a cloth over their mouth and nostrils.

PHYSICAL PROPERTIES.—*Euphorbium* is in tears or small irregular masses, roundish, and angular, somewhat friable; they are of a dull, yellow colour, and pierced with small holes, formed by the spine of the branch on which they concrete. They have a weak odour, but a very acrid and burning taste; the powder snuffed into the nostrils produces much irritation, with incessant sneezing.

CHEMICAL PROPERTIES.—It consists principally of resin the active ingredient, with wax, some caoutchouc, and salts of lime and potash. The resin is soluble in alcohol, but water has no action on it. *Euphorbium* melts when exposed to heat, is inflammable, and burns with a bright flame and rather agreeable odour.

THERAPEUTICAL EFFECTS.—Applied to the surface of the skin it causes much irritation, but does not vesicate or produce any eruption; if the cuticle, however, had been previously removed, its application causes a purulent discharge. It may, therefore, be employed with much advantage mixed with lard as an issue ointment, or for keeping up a discharge from blistered surfaces, being cheap and certain in its effects. For an issue ointment, 25 to 30 grains may be rubbed up with an ounce of lard, and the strength may be increased

or diminished according to circumstances. It possesses the advantage over the preparations of cantharides, that it does not irritate the urinary organs; and over savine ointment that it does not spoil by keeping. The facility with which we can increase or reduce its strength is also of great importance.

IPECACUANHA (described in the division *Emetics*), is an excellent counter-irritant, though sometimes uncertain in its action; applied in the form of liniment, prepared as directed below, it produces an eruption of minute vesicles on an inflamed base in from 36 to 48 hours, which fade away in 3 or 4 days. It possesses the advantage of not causing much pain or constitutional irritation.—*Linimentum Ipecacuanhæ*, (Ipecacuan, in very fine powder, ʒss.; axunge, ʒij.; olive oil, fʒiss.; mix). A fourth part of this should be rubbed well into the part it is desired to irritate, three or four times a day.

MEZEREUM. *Mezereon*, (described in the division *Diaphoretics*). The inner bark of the stem and branches is much employed on the Continent as a vesicatory, but as in the dry state its effects are uncertain and slowly produced, it is not used in this country as such. In France, in order to produce a blister with this substance, a piece of the bark is softened in warm water or in vinegar, and applied to the part with a compress and roller; at first the bark is renewed night and morning, but when the blister is produced it is changed only once daily. An issue ointment is also prepared with it, by digesting for 12 hours the sliced bark in axunge and white wax liquefied together, and straining.

MOXA. *A term borrowed from the Chinese, by whom it was used to designate a cylinder of a cottony substance, which they obtained from the leaves of Artemisia moxa.* This is a small shrub, a native of China, belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnæan class and order *Syngenesia Superflua*.

PREPARATION.—**MOXAS** are prepared in China and Japan, from whence we have derived the use of them, by pounding the downy covering of the leaves until it resembles fine cotton, and rolling into small conical masses. In this country they are prepared either from the pith of the stem of the *Helianthus annuus*, the common sunflower; or by soaking cotton-wool in a concentrated solution of nitre; and forming into small masses of the same shape as the Chinese moxas. More recently Professor Osborne of this city has proposed the use of fresh burned quick-lime, as a substitute for the common moxa, (*Dublin Journal, first series*, vol. xx. p. 409). On the continent a piece of linen soaked in a concentrated solution of acetate of lead, dried and rolled into the proper shape, is usually preferred in the present day. A conical-shaped piece of camphor also forms an excellent moxa.

EFFECTS AND USES.—The first sensation felt on the application of a moxa is rather agreeable, but it soon causes intolerable pain, which, however, does not last long. Redness and inflammation of the part to which it is applied are produced, and an eschar formed immediately under the spot on which it has been placed, which extends to a considerable depth if the moxa be kept long in contact with the skin. The eschar separates in from eight to ten days, the process of inflammation set up for its discharge being attended with more or less suppuration, according to circumstances; and a discharge of purulent matter may be established after the separation of the eschar by the application of irritating unguents or by the insertion of issue peas. Moxas differ from the actual cautery in that their effects are produced more slowly, and that the inflammation caused by them penetrates more deeply. The principal diseases in which the application of moxas has been found beneficial, are, in Pott's curvature of the spine, in inveterate sciatica, in neuralgia, in paraplegia, in chronic inflammation of the joints, in amaurosis, &c. The good effects produced by moxas depend on the principle of counter-irritation. Their use is contra-indicated in all acute inflammatory diseases.

MODE OF EMPLOYMENT.—The apex is set on fire and the base kept firmly applied to the skin by means of a piece of wire or a pair of forceps; the neighbouring parts should be covered with wet pieces of linen to protect them from the sparks; the combustion may be quickened by the blow-pipe or with the breath. Professor Osborne applies the quick-lime moxa as follows:—"Some quick-lime in powder to the depth of about half an inch, is placed on the skin inside a *porte moxa*, or a strip of card bent together and tied so as to form a circle; some water is dropped on and mixed with it. The ordinary lime from a lime-kiln answers well if fresh." Moxas should be applied as close to the seat of the disease as possible; Baron Larrey considers that their application to the following parts of the body is improper:—To the head where the skull is covered with skin and pericranium only; to the eyelids, nose, ears, larynx, trachea, sternum, glandular parts of the breast, linea alba, over the course of superficial tendons, articular prominences, where there is danger of injuring the articular capsules, and projecting points of bone. To these we may add, immediately over the course of large arteries, veins or nerves.

RUTA GRAVEOLENS, (described in the division *Antispasmodics*) The fresh leaves may be employed as a local stimulant and rubefacient.

SABINA.—*Savin* (described in the division *Emmenagogues*) acts as

a powerful local irritant. It is very generally employed in the form of ointment or cerate for keeping up the discharge from a blistered surface, producing what is termed a *perpetual blister*. Owing, however, to the difficulty in preparing the ointment well, and to its losing its properties by long keeping, an ointment prepared with euphorbium (see page 231,) should be preferred for that purpose; one part of powdered savin combined with two parts of finely powdered alum, forms an excellent application to venereal vegetations: it is sprinkled over the part, and the application renewed twice daily; simple dressing being applied in the interval.

PHARMACEUTICAL PREPARATIONS.—*Unguentum Sabineæ*, D. *Ceratum Sabineæ*, L. E. (“Take of savine tops, dried, and in fine powder, one drachm; ointment of white wax, seven drachms. Mix the powder intimately with the ointment by trituration,”) D.—“Savin, (fresh, E.), bruised, ℥j. (2 parts, E.); prepared lard, ℥ij. (4 parts, E.); bees’ wax, ℥ss. (1 part, E.). Boil the savin in the lard and wax melted together, (until the leaves become crisp, E.); and press through a linen (or calico, E.) cloth,” L. E). When well prepared this ointment is of a fine green colour, and has the peculiar odour of savin well marked.

SETONS and ISSUES are employed to produce derivation from some internal organ, by causing a discharge of pus from the surface of the body, as in deep-seated local inflammations; and to establish a drain from the system in many diseases. With the former intention they are employed in ophthalmia, in chronic inflammation of the ear, in diseases of the brain and spinal marrow, in caries of the vertebræ, in chronic articular inflammation, in white swelling, in hip-joint disease, &c. With the latter, in apoplexy, epilepsy, chorea, spasmodic asthma, phthisis, hepatitis, &c. When setons or issues are employed in local affections, they should be applied as near the seat of the disease as practicable; but when used in general diseases, they may be inserted in whatever part of the body is most convenient; thus, setons may be inserted into the nape of the neck, and issues in the inside of the leg or arm.—The introduction of a seton is easily effected with a seton needle, an instrument shaped like a lancet, about 3 inches long, 3-8ths of an inch broad, slightly curved, and having an eye in the handle; a fold of the integuments being held up, the needle is forced through, and by its means a skein of silk, or a piece of India-rubber tape sufficient to fill the aperture, introduced through the wound; a fresh portion of the silk or India-rubber is drawn through the aperture daily, and if it do not produce sufficient irritation, it may be smeared with some irritating ointment. Issues are more employed at present than setons; the manner in which they are inserted has been explained before, (see page 148).

SINAPIS. *Mustard* (described in the division *Emetics*), applied

to the surface of the body, acts as a local irritant, producing inflammation attended with much pain; and if the application be long continued, vesication with even ulceration and gangrene. It is very generally employed in the form of cataplasm, or as it is technically called *sinapism*, to produce counter-irritation: applied to the soles of the feet or calves of the legs, in the low state of typhus fever, especially when stupor or delirium is present, in apoplexy and coma, in narcotic poisoning and in other cases in which there is determination to the head. It is also often applied to the chest with much benefit in many pulmonary and cardiac diseases, and to the surface of the abdomen in painter's colic, and other affections of the abdominal viscera.—*Cataplasma Sinapis*, L. (Mustard-seed; and linseed, each powdered, lbss.; boiling vinegar, sufficient to make a cataplasm). This is a bad form for preparing sinapisms, as vinegar lessens the activity of the mustard; a better plan is simply to mix common table mustard with luke-warm water, and spread the paste on a piece of linen. Sinapisms produce inflammation in from fifteen to twenty minutes after they are applied; the length of time which they should be left on, may be regulated by the feelings of the patient; but if he be insensible, they should be removed as soon as the skin is reddened.

SUCCINI OLEUM. *Oil of Amber*, (described in the division *Antispasmodics*), is an active rubefacient, producing irritation and slight inflammation of the skin when applied with friction. It is sometimes employed in chronic rheumatism and paralysis; but its most general use is as a local application in whooping-cough, in the following form, commonly known as *Roche's embrocation*:—Oil of amber, fʒij.; oil of cloves, fʒj.; olive oil, fʒj.; mix.

TEREBINTHINÆ OLEUM. *Oil of Turpentine* (described in the division *Anthelmintics*), is a speedy and effectual rubefacient, producing active inflammation, succeeded by a crop of small pimples, and sometimes minute blisters, when applied to the surface of the body. If it be applied warm it acts more quickly and more powerfully. As a counter-irritant, it is very generally and very beneficially employed in inflammatory attacks of the thoracic or abdominal viscera, in colic and peritonitis, in sore throat, in chronic rheumatism, in neuralgia, &c.—*Linimentum Terebinthinæ*, D. L. E. ("Take of oil of turpentine, five fluid ounces; ointment of resin, eight ounces. Melt the ointment, then add the oil of turpentine gradually, and stir the mixture until a uniform liniment is obtained," D.—"Soft soap, ʒij.; camphor, ʒj.; oil of turpentine, fʒxvj.; shake them together until they are mixed," L.—"Oil of turpentine, fʒv.; resinous ointment, ʒiv.; camphor, ʒss.; melt the

ointment and gradually mix with the oil and camphor till a uniform liniment be formed," E.). This liniment is powerfully stimulating; it was first proposed by Kentish as an immediate dressing for extensive burns, particularly when the vital powers were sinking; and for this purpose it is employed with much advantage; the parts are first smeared with oil of turpentine, and pledgets of lint covered with this liniment are then applied. It is also used as a counter-irritant, applied with friction in rheumatic and neuralgic pains.—*St. John Long's liniment*, (The yolk of one egg; oil of turpentine, fʒiss.; strong acetic acid, fʒj.; pure water, fʒiij.; first rub the yolk of egg, the water, and the acetic acid together, then add the oil of turpentine, and agitate the whole until they are well mixed;—or, oil of turpentine, and distilled vinegar, of each, equal parts; yolk of egg, sufficient to make a uniform emulsion). This excellent counter-irritant liniment is applied by means of a sponge; its effects vary with the force which is used in rubbing, and with the length of time the application is continued; the principal objection to its use is its very disagreeable smell, which may be somewhat obviated, and its rubefacient powers at the same time rather increased by the addition of a drachm of oil of rosemary.

CHAPTER XIII.

ERRHINES.

(Sternutatories, Ptarmics).

ERRHINES are substances which when applied directly to the lining membrane of the nostrils, cause an increased discharge of its natural secretion. Their medicinal employment is very limited, and in the present day they are seldom resorted to in regular practice. Their remediate powers depend on the derivation which they occasion from the surrounding or neighbouring parts, by the increased secretion from, and consequent afflux of blood to the nasal membrane. Snuffed into the nostrils so as to occasion sneezing, they may be employed to excite respiration when this function is suspended, or to promote the expulsion of foreign bodies lodged in the air passages; their use for these purposes, however, is not unattended with danger, especially in individuals predisposed to apoplexy, hernia or prolapsus uteri. Errhines are also used to promote an increased discharge of mucus in convulsive and spasmodic diseases of the air passages.

ASARUM, L. *Leaves of Asarum europæum. Asarabacca.* An indigenous plant; belonging to the Natural family *Aristolochiaceæ*, and to the Linnæan class and order *Dodecandria Monogynia*.

BOTANICAL CHARACTERS.—Stem very short; Leaves, 2, reniform, petioled, shining; Flower, solitary, from the axil of the two leaves, large, drooping, of a greenish-brown colour and coriaceous substance, upon a short footstalk.

PHYSICAL PROPERTIES.—Although the leaves only are officinal, the whole plant is kept in the shops; it has a faint spicy odour, and a bitter, very acrid taste. The root is the most active part of the plant.

CHEMICAL PROPERTIES.—The only important constituent of the leaves is a peculiar principle which has been named *asarin*; the root contains also an odorous volatile oil, and a very acrid fixed oil.

THERAPEUTICAL EFFECTS.—Asarabacca was formerly employed as a cathartic, diuretic, and emetic, and is used as such even in the present day on many parts of the continent; in this country it is

now only used as an errhine to produce a discharge of mucus from the pituitary membrane in head-ache, in chronic ophthalmia, in coryza, &c.

MODE OF ADMINISTRATION.—Three or four grains of the powdered leaves may be snuffed up into the nostrils night and morning.

EUPHORBIIUM, (described in the division *Epispastics*), operates as a powerful errhine, but its action is so violent, even when diluted with any bland powder, that in the present day it is scarcely ever employed as such.

VERATRUM, L. E. *Root (Rhizome, E.) of Veratrum album. White hellebore.* A native of the mountainous regions of central and Southern Europe; belonging to the Natural family *Melanthaceæ*, and to the Linnæan class and order *Polygamia Monœcia*.

BOTANICAL CHARACTERS.—Rhizome, fleshy, cylindrical, giving origin to numerous undivided radicles; Stem, 1-4 feet high; Leaves, sheathing, plaited, ovato-oblong; Flowers, greenish-yellow, in a large spreading panicle.

PHYSICAL PROPERTIES.—As usually met with in the shops, white hellebore root consists of the rhizome with the radicles attached; it is in pieces of from two to three inches long, about the thickness of the little finger; covered with a rough, dark brown bark; greyish-white internally. In the fresh state, it has a strong, disagreeable smell, which is nearly lost by drying; but it retains the acrid, intensely bitter taste.

CHEMICAL PROPERTIES.—It is composed of a fatty matter, yellow colouring matter, starch, gum, lignin, and an alkaloid on which its acidity depends and which has been named *veratria* (see *Stimulants*), combined with gallic acid, (*Pelletier and Caventou*). More recently Simon has announced the discovery of two new vegetable alkaloids in white hellebore root, one of which he has called *Jervin*, and the other *Barytin*. The acidity of the root is extracted both by water and by alcohol.

THERAPEUTICAL EFFECTS.—The local action of white hellebore root is powerfully irritant. Snuffed up the nostrils it produces a copious flow of mucus, with much sneezing. It may be used as an errhine in the same cases as the other remedies of this class. Two or three grains of the root, finely powdered and mixed with ten or twelve grains of powdered liquorice-root, orris-root, or starch, may be employed every evening. It enters into the composition of most cephalic snuffs. (See, *General Stimulants*).

CHAPTER XIV.

EXPECTORANTS.

(Pectorals).

EXPECTORANTS may be defined, medicines which promote the secretion from the bronchial tubes and air passages, and facilitate its discharge. There are no substances which, by a direct or *specific* action on the lungs, produce expectoration; the medicines which are employed with this intention act relatively, that is to say, they operate through the medium of the system generally, relieving or removing that state of disease which demands the use of expectorants. Consequently, most agents which are used under this name are derived from other divisions of medicinal substances; and there are none more uncertain in their effects. There are two modes in which the medicines employed to promote expectoration seem to act; first, by removing constriction of the pulmonary exhalent vessels, on which principle the nauseating expectorants appear to produce their effects; and secondly, by stimulating these vessels, they either increase the natural exhalation where it is deficient, or alter its character where it is in an unhealthy state. To the ordinary expectorants we may add all emetics, which by their mechanical action dislodge accumulated secretions from the respiratory organs, and thus frequently become most valuable agents in the treatment of many diseases which demand the use of expectorants.

ACIDUM BENZOICUM, D. L. E. *Benzoïc acid. Flowers of Benjamin.*

PREPARATION.—*Dublin.*—"Take of benzoïn any convenient quantity : place it in a small cylindric pot of sheet iron, furnished with a flange at its mouth ; and having fitted the pot into a circular hole in a sheet of pasteboard, interpose between the pasteboard and flange a collar of tow, so as to produce a nearly air-tight junction. Let a cylinder of stiff paper, open at one end, eighteen inches high, and having a diameter at least twice that of the pot, be now placed in an inverted position on the pasteboard, and secured to it by slips of paper and flour paste ; a couple of inches of the lower part of the pot being passed through a hole in a plate of sheet tin, which is to be kept from contact with the pasteboard by the interposition of a few corks, let a heat just sufficient to melt the benzoïn (that of a gas-lamp answers well) be applied, and continued for at least six hours. Let the product thus obtained, if not quite white, be enveloped in bibulous paper, then subjected to powerful pressure, and again sublimed." *London. Edinburgh.*—"Benzoïn, lbj. (any convenient quantity, E.) ; put it into a proper vessel (a glass

matrass, E.); and with a gradually raised heat (from a sand-bath, L.), sublime as long as anything rises; press that which is sublimed between folds of blotting paper to remove the oil from it, and sublime it again."

PHYSICAL PROPERTIES.—In the form of soft, elastic, pearl-white, satiny crystals or scales; inodorous when cold, but having a faint aromatic odour, when warmed, and an acid, penetrating taste. Specific gravity, 0.667.

CHEMICAL PROPERTIES.—Its composition is $C^{14}H^5O^3$ combined in the crystalline state with one equivalent of water. It is permanent in the air; at a temperature of 248° it fuses, and at 293° sublimes; heated in the open air it produces an acrid white vapour which irritates the fauces; it is very inflammable, and burns with a fuliginous flame, leaving no residue. Benzoic acid requires 200 parts of cold water, or 25 of boiling water for its solution; it dissolves in 2 parts of cold alcohol or ether, and in a less quantity of acetic acid or oil of turpentine. It possesses the usual characteristics of a weak acid.

Adulterations.—It is not liable to adulteration, but is often badly prepared; when good it is colourless, entirely sublimed by a gentle heat, and completely soluble in solution of potash or lime water.

THERAPEUTICAL EFFECTS.—Although formerly highly esteemed as a stimulating expectorant in chronic bronchitis, in the present day it is scarcely ever employed, except in the *Tinctura opii camphorata*, D. E. *Tinctura camphoræ composita*, L., and the *Tinctura opii ammoniata*, E. in both of which preparations it is an ingredient.*

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xxx.; it should be dissolved in a large quantity of water, as otherwise it is apt to irritate the fauces: its solubility is much increased by giving it in combination with phosphate or baborate of soda.

INCOMPATIBLES.—Alkalies, and their carbonates; metallic salts, &c.

ANTIMONII ET POTASSÆ TARTRAS. *Tartar emetic* (described in the division *Diaphoretics*), administered in small doses, from 1-16th to 1-10th of a grain frequently repeated, operates as an expectorant, but its effects as such are more certainly manifested, if it be given so as to produce nausea. It is best adapted for *acute* attacks of inflammation of the lungs or bronchial membrane.

* Dr. Ure, of London, a few years ago called the attention of the profession to the chemical change which takes place in the composition of the urine when benzoic acid is taken into the stomach: namely, the conversion of the insoluble *uric acid* and its salts into the soluble *hippuric acid* and *hippurates*. He therefore proposed its employment in all cases accompanied by increased secretion of uric acid, as in gout, rheumatism, and calculous disorders. In a case of uric acid gravel, in which I employed benzoic acid, the deposit in the urine apparently ceased while the use of the acid was continued; but returned to a greater extent than before when its administration was stopped. From the recent experiments of Keller, Booth, Boyé, and others, it has been shown that although benzoic acid is converted into hippuric acid in the system, and excreted by the kidneys in this form, the secretion of uric acid is not affected either in regard to its quantity or chemical properties by it; from which it results that benzoic acid cannot be looked upon as a remedy for uric acid diseases.

BALSAMUM PERUVIANUM, L. E. *Balsam of Peru*; *Liquid balsam of Myroxylon peruiferum*, L.—*Fluid balsamic exudation of Myrospermum peruiferum*, E. A native of the forests of Peru, New Granada, and Columbia; belonging to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL CHARACTERS.—A lofty, handsome, branching tree, with a smooth, thick, very resinous bark; Leaves alternate, pinnated, consisting of eleven leaflets, which are ovate, blunt, and downy on their midrib and petiole; Flowers white, in axillary racemes; Fruit, a legume.

PREPARATION.—It is procured in two ways; the finest, which is not met with in British commerce, by incisions made into the bark of the tree; the second quality, by boiling the young branches and the bark of the trunk in water: many pharmacologists, however, doubt that any of it is procured by the latter method.

PHYSICAL PROPERTIES.—Balsam of Peru, as it occurs in English commerce, is a thick, semi-transparent, heavy liquid, of a dark reddish-brown colour. It has an agreeable aromatic odour, and a warm, bitterish taste. Specific gravity about 1.160.

CHEMICAL PROPERTIES.—According to the analysis of Fremy, it is composed of an oily matter which he has named *cinnameïne*, of *cinnamomic acid* (*Benzoïc acid* of previous chemists), and one or more resins. Exposed to the air it becomes more dense, but does not dry up; it is inflammable, burning with a bright flame and much smoke, and diffusing a very agreeable odour; it is insoluble in cold water, but water boiled with it acquires its agreeable odour; it is soluble in alcohol in all proportions, but it is only partially dissolved by ether.

Adulterations.—It is said to be adulterated with alcohol; this fraud is known by its low density, and by its losing volume when mixed with cold water.

THERAPEUTICAL EFFECTS.—Balsam of Peru is a mildly stimulating expectorant, and as such was at one time much employed in chronic bronchitis, in the advanced stages of phthisis, and in old asthmatic cases; it has, however, completely fallen into disuse as an internal remedy.

DOSE AND MODE OF ADMINISTRATION.—Min. xx. to min. xl., suspended in aqueous vehicles, by means of mucilage or yolk of egg.

BALSAMUM TOLUTANUM, D. L. E. *Balsam of Tolu*; *Concrete balsamic exudation of Myrospermum toluiferum*, D. E.—*of Myroxylon peruiferum*, L. Although the London College, on the authority of Ruiz, refers the balsams of Tolu and of Peru to the same tree, more recent observation has shown that they are from distinct species. The *Myrospermum toluiferum* is a native of the mountainous districts of Tolu, Turbaco, and the neighbourhood of the river Magdalena; it belongs to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL CHARACTERS.—Precisely similar to *Myrospermum peruiferum*, except the leaves, which are oblong, acuminate, and smooth upon the petiole and midrib.

PREPARATION.—It exudes in the liquid state from incisions made into the bark of the tree, but it soon concretes on exposure to the air.

PHYSICAL PROPERTIES.—In solid masses of a resinous appearance, and a reddish yellow colour. It has a peculiar fragrant odour, more agreeable than the balsam of Peru, and a sweet aromatic taste.

CHEMICAL PROPERTIES.—Its composition is the same as that of the balsam of Peru. It becomes more solid by exposure to the air, it melts by heat, and is inflammable, burning with a fuliginous flame, and a very agreeable odour. It is soluble in alcohol and ether, and boiling water dissolves out its fragrant acid.

THERAPEUTICAL EFFECTS.—It is a stimulating expectorant, and in consequence of its agreeable flavour, is very much used as an adjunct to pectoral mixtures; but it should not be employed when there is any inflammatory action present.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xxx.; it is best administered suspended in aqueous vehicles by means of mucilage or yolk of egg.—*Tinctura Tolutana*, D. E. *Tinctura Balsami Tolutani*, L. (Tolu balsam, ʒij. (ʒiiss. E.); rectified spirit, Oj. (Oij. L. E.); “dissolve the balsam in the spirit with the aid of a gentle heat, let it stand until the sediment subsides, then decant the clear tincture,” D. “Digest (with a gentle heat, E.), until the balsam is dissolved, and filter,” L. E.). Dose, fʒj. to fʒij.; it is precipitated when added to water, but it may be suspended in water by means of mucilage or syrup.—*Syrupus Tolutanus*, D. L. E. (“Take of balsam of Tolu, one ounce; distilled water, one pint; refined sugar, in powder, as much as is sufficient: boil the balsam in the water for half an hour, in a lightly covered vessel, occasionally stirring, and strain the liquor when cold; then, having added to it twice its weight of sugar, dissolve with the aid of a steam or water heat,” D. —“Balsam of Tolu, 3x.; boiling water, Oj.; sugar, ℥iiss.; boil the balsam in the water for half an hour in a vessel lightly covered, frequently stirring, and strain the cooled liquor; then add the sugar and dissolve it,” L.—“Tincture of Tolu, ʒj.; simple syrup, ℥ij.; when the syrup has been recently made and has not altogether cooled, add the tincture by degrees, agitating briskly,” E.). Dose, fʒij. to fʒss.; merely used as a flavouring adjunct. Tolu lozenges prepared with the syrup and sufficient gum are a popular and useful remedy in chronic coughs.

BENZOINUM, D. L. E. *Benzoïn*. *The concrete exudation*, D.—*The balsam*, L.—*Concrete balsamic exudation*, E.—*of Styrax benzoïn*. A native of Sumatra, Borneo, and Java; belonging to the Natural family *Ebenaceæ* (*Styracaceæ*, Lindley), and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL CHARACTERS.—A tall tree with rounded branches, and a whitish bark; Leaves entire, pointed, tomentose beneath; Flowers, in compound axillary racemes.

PREPARATION.—The balsamic exudation is procured by making incisions into the bark of the tree, and allowing the liquid which exudes to concreate on the stem; when it is quite hard it is removed, and fresh incisions made, by which an inferior quality is obtained.

PHYSICAL PROPERTIES.—Benzoin occurs in large masses of a reddish-brown colour externally, with a waxy, somewhat shining fracture, presenting many whitish amygdaloid tears cemented together by a reddish substance; the inferior qualities contain but few tears and are of a more uniform reddish-brown colour all through. The French pharmacutists describe another variety in tears of a pale yellow colour, but it is not met with in the English market. Benzoin has an agreeable aromatic odour, and a sweet balsamic taste; the odour and taste of the inferior qualities are much less agreeable. Specific gravity about 1.065.

CHEMICAL PROPERTIES.—It is composed of about 28 per cent. of resin soluble in ether, 50 of resin insoluble in ether, and about 14 of benzoic acid, with a trace of volatile oil, aromatic extract, &c., (Kopp). It is permanent in the air, heated it fuses and benzoic acid is sublimed; it is inflammable, burning with a fuliginous flame and an agreeable odour. It is partly soluble in alcohol, ether, and acetic acid; boiling water dissolves out the benzoic acid.

THERAPEUTICAL EFFECTS.—Benzoin is a stimulating expectorant, formerly much used in chronic cough, in old cases of bronchitis, and in the advanced stages of phthisis; in the present day it is not much employed. Like the other stimulating expectorants, it is inadmissible in inflammatory cases.

DOSE AND MODE OF ADMINISTRATION.—It is not used in the solid state.—*Tinctura Benzoini composita*, L. E. ("Benzoin, 3iiss.; purified storax, 3iiss.; balsam of Tolu, 3x.; Socotrine aloes, 3v.; rectified spirit, Oij.; macerate for 14 days and strain;" L.—"Benzoin, in coarse powder, 3iv.; Peru balsam, 3iiss.; East Indian aloes, 3ss.; rectified spirit, Oij.; digest for 7 days, pour off the clear liquor and filter it," E.). A stimulating expectorant; Dose, f3ss. to f3ij., as an adjunct to pectoral mixtures; it is precipitated by water, but may be mixed with water by means of mucilage, yolk of egg, or syrup. This tincture was formerly much employed as an application to wounds and contusions, under the name of *Friar's Balsam*.

IPECACUANHA (described in the division *Emetics*), administered in small but frequently repeated doses, a fourth of a grain to half a grain, acts as an expectorant, but its effects as such are much more surely manifested if nausea be at the same time produced. In some cases of chronic inflammation of the bronchial mucous membrane accompanied by profuse secretion, it operates beneficially, not by promoting expectoration, but by diminishing the discharge, and by some specific action restoring the parts to a healthy state. In acute

or inflammatory diseases of the lungs or bronchial tubes, ipecacuanha to prove beneficial must be given in doses sufficient to produce nausea or even vomiting; but in chronic affections of the same parts, more advantage will be derived from smaller doses. As an expectorant, the doses of Ipecacuanha and its preparations are as follows:—In *powder*, gr. $\frac{1}{4}$ th to gr. ij.—*Vinum Ipecacuanhæ*, D. L. E., min. x. to min. xl.—*Syrupus Ipecacuanhæ*, E., f3j. to f3ij.—*Pilulæ Ipecacuanhæ compositæ*, L. (Compound powder of ipecacuanha, 3iij.; squill, fresh dried; and ammoniacum, of each, 3j.; mixture of acacia, q. s.; beat together till they are incorporated). A useful stimulating expectorant in habitual cough affecting the old and debilitated. Dose, gr. v., three or four times a day. Every five grains contain about a fourth of a grain each of ipecacuan and opium.

LOBELIA, D. L. E. *Lobelia*. *Indian tobacco*. *The herb of Lobelia inflata*. A native of the United States, where it is a very common weed growing on road sides and in neglected fields; it belongs to the Natural family *Lobeliaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Annual, 1-2 feet high, with a branching stem; Leaves, scattered, alternate, oblong; Flowers, pale blue, in terminal racemes; Capsules, ovoid, inflated.

PREPARATION.—The entire herb is collected in the end of August, as soon as the capsules are formed, and carefully dried. It is imported from America compressed into rectangular masses, being prepared for exportation by the Shaking Quakers of New Lebanon in the State of New York.

PHYSICAL PROPERTIES.—Its odour is faint but disagreeable, and the taste at first insipid, but when chewed, very acrid, and resembling that of tobacco, causing, like it, a flow of saliva and a nauseating effect on the stomach.

CHEMICAL PROPERTIES.—According to the analysis of Mr. Proctor, lobelia contains an acrid volatile oil, a peculiar principle named by him *Lobelina*, lobelic acid, gum, resin, fixed oil, chlorophylle, extractive, and various salts. Reinsch, who has more recently analysed this plant, named the active principle he obtained *Lobeleïn*; he obtained it by the successive action of alcohol, ether, and water; it is a shining-yellow hygroscopic substance, probably nearly analogous to the active principle of tobacco; the active properties of lobelia are soluble in water, alcohol, and ether.

THERAPEUTICAL EFFECTS.—Lobelia was employed by the native Indians of North America as an emetic, but its action as such is highly irritating and attended with much danger, for if it fail to excite vomiting soon after it has been taken, it produces all the symptoms of a powerful narcotico-acrid poison, and so small a quantity as a teaspoonful of the powdered leaves has proved fatal in some instances. In small doses, however, it is a most valuable sedative expectorant, apparently possessing a specific power in

allaying spasm of the bronchial tubes. It is therefore employed with most benefit in paroxysmal diseases of the lungs, as in asthma and hooping cough; it has also proved serviceable in the obstinate cough of chronic bronchitis, and in the latter stages of croup. Lobelia has been recently used as a specific for all diseases by a sect of quacks in England, appropriately named after their leader *Coffinites*, and as a result of their treatment numerous individuals have been poisoned.

DOSE AND MODE OF ADMINISTRATION.—Lobelia is seldom given in the form of powder; the dose, as an expectorant, is from gr. j. to gr. v.—*Tinctura Lobeliæ*, D. E. (Dried lobelia, in coarse powder (in moderately fine powder, E.), $\bar{3}v.$; proof spirit, Oij.; “macerate for 14 days, strain, express and filter,” D.; “this tincture is best prepared by the process of percolation as directed for tincture of capsicum, but it may be also made in the usual way of digestion,” E.). Dose, $\bar{f}3ss.$ to $\bar{f}3j.$; larger doses are apt to prove emetic.—*Tinctura Lobeliæ Ætherea*, E. (Dried lobelia, in moderately fine powder, $\bar{3}v.$; spirit of sulphuric ether, Oij.; best prepared by percolation as directed for tincture of capsicum; but it may be also obtained by digestion in a well closed vessel for 7 days). Dose, min. xx. to min. xl. The latter preparation is usually preferred in asthmatic cases, in consequence of the sedative properties of the sulphuric ether.—*Whitlaw's ethereal tincture of lobelia*, (Dried lobelia, $\bar{t}bj.$; rectified spirit, Oiv.; spirit of nitric ether, Oiv.; spirit of sulphuric ether, $\bar{3}iv.$; macerate for 14 days in a dark place, and filter). This was the preparation of lobelia most generally employed in this country; Dose, min. v. to min. xx.

MARRUBIUM VULGARE, L. *White Horehound*. An indigenous plant growing in waste places and by road sides, belonging to the Natural family *Labiatae* (*Lamiaceæ*, Lindley), and to the Linnæan class and order *Didynamia Gymnospermia*.

BOTANICAL CHARACTERS.—About a foot and a-half high, every where hoary with a white thick pubescence or woolliness; Flowers, small, white, in crowded whorls.

PROPERTIES.—The whole plant has a peculiar aromatic odour, and a very bitter balsamic taste. Its properties depend on volatile oil and extractive, it also contains tannic acid; it yields its virtues to boiling water and to alcohol.

THERAPEUTICAL EFFECTS —White horehound was long held in high estimation as a tonic expectorant. In the present day it is commonly employed as a domestic remedy in chronic coughs; but it is scarcely ever used in regular practice. It is generally given in the form of infusion, *Horehound tea*, prepared by infusing $\bar{3}j.$ of the herb in Oj. of boiling water for an hour, of which the dose is $\bar{f}3ijj.$ or $\bar{f}3iv.$, sweetened with sugar; or in the form of confection, *Candied Horehound*, prepared by evaporating a strong syrup of the herb to

dryness: a small bit of this may be allowed to dissolve in the mouth frequently.

INCOMPATIBLES.—The sesquialts of iron: ipecacuanha and tartar emetic.

SCILLA. *Squill* (described in the division *Diuretics*), in small doses frequently repeated, promotes the secretion of the bronchial mucous membrane; it is not, however, a stimulating expectorant as is generally stated, and may therefore be prescribed in the acute and subacute stages of pulmonary affections as well as in the chronic. It proves more serviceable in the bronchitis and pneumonia of children than in the same diseases in adults. From the property which squill possesses of promoting the secretion of mucus, it facilitates expectoration in some forms of asthma and chronic bronchitis in which the sputa are viscid; in these cases it is advantageously combined with the more stimulating remedies of this class. The dose of powdered squill as an expectorant should not exceed gr. j., frequently repeated. The oxymel or syrup is one of the most useful expectorants we possess for the pulmonary affections of children, in doses of min. x. to min. xxx. The tincture is employed as an adjunct to pectoral mixtures in chronic bronchial affections; Dose, min. x. to min. xxx.—*Pilulæ Scillæ compositæ*, D. L. (Squill, in fine powder (fresh dried and powdered, L.), 3j.; ginger, in fine powder, 3ij.; ammoniacum, in fine powder, 3ij.; soap (Castile, D.), 3ij. (3iij. L.); “treacle, *by weight*, 3ss.; reduce the soap to powder, and triturate it with the squill, ginger and ammoniac; then add the treacle and beat them all into a mass of a uniform consistence,” D. “Mix the powders together, then heat them with the soap, and with sufficient syrup, beat to a proper consistence,” L.).—*Pilulæ Scillæ*, E. (Squill, in fine powder, 5 parts; ammoniac; ginger, in fine powder; and Spanish soap, of each, 4 parts; conserve of red roses, 2 parts, mix the powders, add the other articles, beat them into a uniform mass and divide it into five-grain pills). Dose, gr. v. to gr. xv. in chronic catarrh and asthma. It spoils by keeping.—*Syrupus Scillæ compositus*, U. S. (Squill, bruised; seneka, bruised, of each, 3iv.; tartar emetic, gr. xlvij.; water, Oiv.; sugar, lbiiiss.; pour the water on the squill and seneka, boil to one-half and strain; add the sugar, evaporate the whole to Oij., and while hot dissolve in it the tartar emetic). An excellent formula, particularly adapted for croup and chronic bronchitis in children: dose for adults, f3j. to f3ij.; for children, min. v. to min. xv.

SENEGA, D. L. E. *Seneka*; *Snake root*; *Root of Polygala senega*. A native of the United States; belonging to the Natural family *Polygalaceæ*, and to the Linnæan class and order *Diadelphia Octandria*.

BOTANICAL CHARACTERS.—Root, perennial; Stems numerous, annual, from nine inches to a foot high; Leaves, sessile, ovato-lanceolate; Flowers, small, white, in spiked racemes; Capsule, small, elliptical, containing two small black seeds.

PHYSICAL PROPERTIES.—Root varying in size from the thickness of a writing pen to that of the little finger, contorted, knotty, marked with slight eminences on one side; cortical portion resinous, greyish or yellowish externally, whitish internally; central portion (*medullium*), whitish, woody, inert. The root has a faint, peculiar odour, and a taste at first mucilaginous, afterwards nauseous and acrid.

CHEMICAL PROPERTIES.—It is composed of tannic and pectic acids, wax, fixed oil, gum, albumen, colouring matter, lignin, some salts, and a peculiar acrid principle, which, according to Quevenne, consists of two volatile acids, named by him *Polygalic* and *Virginic* acids, the former of which appears to be the active principle of the plant. It yields its properties to both water and to alcohol; according to some recent observations, it appears that by the continued action of boiling water on the root, part of the active principle is formed into an insoluble compound with the colouring matter and albumen; therefore the Dublin and Edinburgh Colleges have substituted an infusion for the decoction of the former pharmacopœias.

THERAPEUTICAL EFFECTS.—Seneka root is a stimulating expectorant of much power, peculiarly fitted for the advanced stages of chronic bronchitis and of pneumonia, especially when occurring in the aged and debilitated. It is also a very valuable remedy in protracted hooping cough, and in the latter stages of croup and of bronchitis in infants and children.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to ʒss.; this is the best form for the administration of seneka, in the pulmonary affections of children.—*Infusum Polygalæ*, D.—*Senegæ*, E. ("Take of polygala root, bruised, half an ounce; boiling water, nine ounces. Digest for one hour in a covered vessel, and strain. The product should measure about eight ounces," D.—"Seneka, ʒx.; boiling water, Oj.; infuse for four hours in a covered vessel and strain," E.). An excellent vehicle for other remedies in old cases of catarrh and bronchitis. Dose, fʒij. to fʒiij.—*Decoctum Senegæ*, L. (Seneka, ʒx.; distilled water, Oij.; boil down to Oj. and strain). Not so good a form as the infusion, for the reasons above stated.

STYRAX, L. E. *Storax*; *Balsamic exudation of Styra officinale*. A native of the Levant, Palestine, and Arabia, and cultivated in the south of Europe; it belongs to the Natural family *Ebenaceæ* (*Styracaceæ*, Lindley), and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL CHARACTERS.—Stem from 15 to 25 feet high, branching at the top; Leaves, alternate, ovate, villous beneath; Flowers, white, in small racemes; Fruit, a coriaceous capsule, downy, one-seeded.

PREPARATION.—The process followed for obtaining storax from the tree is not accurately known, but it is supposed to be procured from incisions made into the tree, or from the punctures of insects.

PHYSICAL PROPERTIES.—A great many varieties of storax have been described by pharmacologists; two are most generally met with.—1. *Liquid storax*; of this I have met with two sorts; one a greyish substance of the consistence of bird-lime, with a strong odour having some resemblance to that of impure naphtha, acquiring a dirty brown colour on exposure to the air; the other, a shining black, very viscid liquid, becoming more fluid when heated, with a very agreeable, aromatic odour; both sorts have a pungent balsamic taste.—2. *Common storax*; this is in very friable reddish-brown masses, with an agreeable, aromatic odour, and a warm, somewhat acid taste; it appears to be saw-dust cemented together by some liquid resin.

CHEMICAL PROPERTIES.—The medicinal virtues of storax depend on the presence of volatile oil, benzoïc acid, and resinous extractive. It yields its active properties to alcohol, but merely its fragrancy to boiling water.

Adulterations.—No accurate account could be given of the adulterations of storax, so many different substances are sold under that name. The grey liquid storax is manifestly some compound of impure naphtha.

THERAPEUTICAL EFFECTS.—Formerly employed as an expectorant in the same cases as benzoïn; in the present day it is only used as an ingredient in the *Pilulæ Styracis* (see, Opium), to conceal the odour and taste of the opium.

PHARMACEUTICAL PREPARATIONS.—*Styrax colatus*, L. *Extractum Styracis*, E. (Dissolve storax in (by boiling in successive quantities of, E.) rectified spirit, and strain; distil off the spirit, and evaporate with a gentle heat (over the vapour bath, E.) to a proper consistence, L. the consistence of a thin extract, E.) Only used in the above preparation.

CHAPTER XV.

NARCOTICS.

(Anodynes ; Hypnotics ; Soporifics).

NARCOTICS may be defined, medicines which produce a primary stimulating effect on the nervous and vascular systems, rapidly followed by a depression of the vital powers and sleep, or if a large quantity of the substance be swallowed, by coma. The primary stage, that of excitement, varies much both as to the degree in which it is produced and as to its duration; depending chiefly on the manner in which the narcotic is administered, on idiosyncrasy, and on habit. In large doses, the stage of excitement is so short, and the depression of vital power so immediate, that it has led many to deny altogether the stimulant property of narcotics, and to regard them as producing direct sedative effects on the system. An attentive consideration, however, of the *modus operandi* of the medicinal agents described in this chapter, and a comparison of them with those which are contained in the chapter on Sedatives, must, I think, satisfactorily prove that their operation is perfectly different. Indeed, some narcotics, as opium, are frequently administered with the intention of producing a stimulant action only. When given with this intention, the doses should be small, but frequently repeated, in order to sustain the state of excitement; but when administered with the view of producing sleep, the doses should be larger, and repeated at more distant intervals. All these points, however, will be more fully explained in the description of the therapeutical effects of the individual remedies of the class. Idiosyncrasy has a remarkable influence on the effects of narcotics; we meet with some individuals almost insensible to their action; while in others, small doses produce a dangerous stupifying effect, or in some instances give rise to a degree of excitement amounting to furious delirium. But habit influences the action of narcotics on the system more than any other circumstance, their power being diminished in an extraordinary degree by repetition; where therefore their continued administration is required, it will be necessary to augment the dose gradually, in order that their usual effects may be produced. The influence of age on their action must also be borne in mind in their

administration; the young being much more susceptible to their influence than individuals of mature age. The close connection that exists between narcotics and stimulants is well exemplified in the effects of alcoholic stimulants on the system; to these which are so well known I need not further refer here than to point out the distinction that exists in their mode of operation: stimulants produce narcotism simply by their *exhausting* action on the nervous system, and to cause it they must be given in an overdose; while narcotics have a direct and specific effect on the functions of the cerebro-spinal system of nerves, allaying pain and irritation even before narcotism is produced. We thus see that this class of medicinal agents closely resembles and partakes of the characters of both sedatives and stimulants; and no other proves so distinctly the difficulty of forming a therapeutical classification of the *Materia Medica* based on true scientific principles: in fact not here alone, but in medicine generally, science is often well sacrificed to utility.

BELLADONNA, D. L. E. *Leaves (and root, D.) of Atropa belladonna. Deadly nightshade.* An indigenous plant; belonging to the Natural family *Solanaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Root, fleshy, creeping; Stems 3-4 feet high, herbaceous; Leaves, ovate, acute, entire, smooth, some very large, but placed in pairs of unequal sizes; Flowers, axillary, on short peduncles, drooping, lurid purple, about an inch long; Berries, shining, black, about the size of a black cherry, filled with a sweetish pulp in which are imbedded many kidney-shaped seeds.

PREPARATION.—The root, which is contained only in the *Dublin Pharmacopœia*, is scarcely ever used at present; it should be dug up in the month of March, and dried quickly. The leaves are gathered in June and July before the flowers expand, and dried with a stove heat.

PHYSICAL PROPERTIES.—Belladonna root is from one to two inches in diameter, and a foot or more in length; it is of a grayish-white colour internally, grayish-yellow externally; it has a faint nauseous odour, and a slightly astringent bitter taste. The leaves when fresh are of a sombre-green colour, which becomes yellowish-green in drying; they have a feeble odour, and a herbaceous, somewhat nauseous taste.

CHEMICAL PROPERTIES.—The medicinal properties of belladonna depend on a peculiar principle which has been named *atropia*; it was first discovered by M. Brandes in the leaves, in which he found it to exist in combination with malic acid, two nitrogenous extractive matters called by him *pseudotoxin* and *phytocolla*, gum, wax, chlorophylle, starch, albumen, lignin, salts, &c. ATROPIA

when obtained quite pure is in white transparent prismatic crystals of a silky lustre. It is without odour, but possesses a nauseously bitter, acrid taste; it requires for its solution 500 parts of cold water, the solution having a bitter taste and an alkaline reaction, but is very soluble in alcohol and ether; it combines with acids to form salts. The composition of atropia, according to Liebig, is $C^{34} H^{23} O^6 N$. Belladonna leaves and root yield their active principles to both water and alcohol.

Adulterations.—The leaves of the *Solanum nigrum* are sometimes sold for those of the *Atropa belladonna*; the former are smaller, obtuse angled, not acuminate, and they are bluntly toothed; by which characters they may be readily distinguished.

THERAPEUTICAL EFFECTS.—Belladonna acts on the system as a powerful narcotic, in large doses proving an active poison, causing constriction of the throat with ineffectual efforts to vomit, delirium usually of a gay or mirthful character, with excessive dilatation of the pupils, then coma which is followed by death unless active treatment be immediately employed. In medicinal doses it operates as an anodyne and calmative, diminishing pain and over-excitement of the nervous system; with this intention it has been employed in most neuralgic and convulsive diseases, but it is not so much used at present in these affections as it formerly was. It has been generally stated that belladonna should not be employed in acute inflammations or febrile affections, but more recent observations have shown that a state of inflammation in the system does not contraindicate its use. The diseases in the treatment of which belladonna is found most beneficial are the varieties of neuralgia, and spasmodic and painful affections; thus it has been found most useful in tic douloureux, in all forms of external neuralgic pains, in nervous palpitations, in hysteria, in epilepsy, in whooping cough, in spasmodic stricture of the urethra, in painful spasm of the *sphincter ani* when there is no fissure of the part, in dysmenorrhœa, in orchitis after the acute stage has subsided, in painful glandular enlargements, in chronic arthritis, in the flying pains of rheumatism and in incontinence of urine in children. In all these cases, the external employment of the drug is advantageously combined with its internal administration. Belladonna has been used as a prophylactic of scarlatina when that disease rages as an epidemic, and several instances of its apparent success as such were, I believe, first narrated in Germany; later experience has fully confirmed its powers in preventing the spread of this affection, when it breaks out in schools or where many young persons are congregated together; amongst the most recent investigations on this subject may be cited, those of M. Lecointe of Paris, in which 2227 children and adults had been preserved from scarlatina by its use; those at Langendorf, in Prussia, where in the Orphan Hospital, out of 160 inmates to whom the drug was administered immediately on the breaking out of an epidemic, but two contracted the disease; and those of Dr. Newbigging in Watson's Institution in Edinburgh, where out of 69 children ex-

posed to the contagion but 3 took the disease. Belladonna applied externally in the neighbourhood of the eye, causes, after the lapse of a few hours, dilatation of the pupil unattended with any disturbance of vision; to produce this effect it is employed in the operation for cataract, in iritis to prevent adhesions from forming, and in other ophthalmic affections to enable the posterior chamber of the eye to be examined with greater facility.

The alkaloid atropia has for some years back been used on the continent, particularly in Germany, and more lately in this country, in the treatment of diseases of the eye; Mr. Wilde was the first physician in this country to publish his experience of its effects.* He has found a single drop of solution of atropia, No. 1, (*see below*), dropped on the lower lid, to dilate the pupil to double its ordinary size, or rather more, in from 5 to 15 minutes after its application; the dilatation lasting for four or five days. Mr. Wilde uses the solution of atropia in the same cases as he would extract of belladonna, over which it possesses the advantages:—of being much more efficacious, and much more cleanly, and of producing neither pain nor irritation when dropped into the eye; it is also free from the objection to which extract of belladonna is liable, that of producing an unpleasant eruption around the eye-brow on which it has been applied.

DOSE AND MODE OF ADMINISTRATION.—Dose of the powdered leaves, gr. j., which should be increased very gradually until dryness of the throat is produced. As a prophylactic of scarlatina it is given twice a day, in doses of from $\frac{1}{3}$ th to $\frac{1}{3}$ rd of a grain, according to the age of the child.—*Extractum Belladonnæ*, D. L. E. (“Take of fresh belladonna leaves, collected when the plant begins to flower, any convenient quantity. Crush them in a mortar, express the juice, and allow it to stand for twenty-four hours. Pour off the clear liquor, and set it aside for subsequent use; and having placed the sediment on a calico filter, wash it with an equal bulk of distilled water, and mix the washings with the decanted liquor. When, by the application of a water heat, coagulation has occurred, skim off the coagulated matter, filter the hot liquid through flannel, mix in now the washed sediment, and evaporate to the consistence of a firm extract, by a steam or water bath, constantly stirring, particularly towards the close of the evaporation,” D.—“Fresh belladonna leaves, lbj.; bruise them, sprinkled with a little water, in a stone mortar; then press out the juice, and evaporate it unstrained to a proper consistence,” L.—“Fresh belladonna, any quantity; bruise it in a marble mortar into a uniform pulp, express the juice; moisten the residuum with water and express again. Unite the expressed liquids, filter them, and evaporate the filtered liquid in the vapour bath to the consistence of a firm extract, stirring constantly towards the close,” E.). Dose, gr. ss., gradually increased to gr. iij. or gr. iv. This is the preparation generally employed to dilate the

* *Dublin Quarterly Journal of Medical Science*, New Series, vol. 2, p. 553, 1846.

pupil, for which purpose it is applied round the eye; in spasm of the urethra preventing the introduction of an instrument, the catheter has been smeared with extract of belladonna, but the benefit derived from its use is doubtful. It has been also applied to the os uteri in protracted labour caused by rigidity.—*Emplastrum Belladonnæ*, D. L. E. (“Take of extract of belladonna, one ounce; resin plaster, two ounces: melt the plaster by the heat of a steam or water bath, then add the extract, and mix them intimately,” D.—“Resin plaster, ʒiij.; extract of belladonna, ʒiiss.; add the extract to the plaster, melted by the heat of a vapour bath (with a gentle heat, E.), and mix them,” L. E.). An excellent local application over the sacrum in dysmennorrhœa, and for the relief of neuralgic and other pains.—*Tinctura foliorum Belladonnæ*, D. (Take of belladonna leaves, dried, and in coarse powder, five ounces; proof spirit, two pints: macerate for fourteen days, strain, express, and filter). Dose, min. iij. to min. viij.; fʒj. added to fʒiv. of water or of any liniment may be used as a lotion.—*Unguentum Belladonnæ*, (Extract of belladonna, ʒij.; axunge, ʒj.; mix). In painful hemorrhoidal affections, in chordec, in orchitis, and in neuralgia.—*Succus Belladonnæ*, (Prepared by expressing the fresh leaves collected in the beginning of July, setting aside the expressed juice for 48 hours, and adding to the clear decanted liquor a fifth part of rectified spirit). Dose, min. xx. to min. xl. gradually increased.—*Solution of Atropia*, WILDE. (Atropia, gr. j.; dilute nitric acid, min. j.; rectified spirit, min. iij.; distilled water, fʒj.; mix). A solution of this strength is labelled No. 1.; Nos, 2 and 3 contain respectively two and three grains of atropia.

In poisoning with belladonna, stimulating emetics followed by active cathartics should be employed, with cold applications to the head; and if coma be present, ammonia should be administered, and the usual external stimulants applied.

CANNABIS INDICA, D.—*Indian hemp; the extract*. According to the most recent observations, it would appear that the Indian hemp is precisely identical in botanical characters with the common hemp of this country, the *Cannabis sativa*; differing only in the secretion of a resin with which it abounds, and which is totally absent in the European kind. It grows in India, Persia and Africa; and belongs to the Natural family *Urticaceæ* (*Cannabinaceæ*, Lindley), and to the Linnæan class and order *Diacia Pentandria*.

BOTANICAL CHARACTERS.—Annual, about 3 feet high; Stem branching, pubescent, angular; Leaves, alternate or opposite, digitate, scabrous, on long, weak petioles; leaflets, linear, lanceolate, sharply serrated; Flowers, dioecious, in axillary clusters; Achenium, ovate, one-seeded.

PREPARATION.—The dried plant and resin are both used, although the latter only is officinal in the Dublin pharmacopœia; the former is cut when the plant is in flower, and allowed to dry in the sun for three days, care being taken not to remove the resin;

it is called in India, *Gunjah*. The resin which is called *Churrus*, is collected in Central India and in Nipal in the following manner:—"Men clad in leathern dresses run through the hemp fields, brushing through the plant with all possible violence; the soft resin adheres to the leather, and is subsequently scraped off, and kneaded into balls; a finer kind is collected with the hand; in some instances the leathern attire is dispensed with, and the resin is gathered on the skins of naked coolies," (O'Shaughnessy). Purified by the following process it constitutes *Extractum Cannabis Indicæ Purificatum*, D.:—"Take of extract of Indian hemp of commerce, one ounce; rectified spirit, four fluid ounces: dissolve the extract in the spirit, and when the dregs have subsided, decant the clear liquid, and evaporate, by means of a water bath, to the consistence of a soft extract."

PHYSICAL PROPERTIES.—*Gunjah* is sold in bundles about two feet long, and three inches in diameter; it consists of the stems with the leaves and flowers accreted together by the resinous exudation; it is of a dusky green colour, and has an agreeable narcotic odour (as met with in this country, however, the odour is feeble), and a bitter taste resembling that of tobacco. *Churrus*—the officinal extract of the Dublin College—is a hard resin, of a blackish-grey colour, a fragrant narcotic odour, and a bitterish, acrid, slightly warm taste. The leaves and capsules without the stalks are sold in India under the name *Bang*, *Subjee*, or *Sidhee*; they have been also imported into Britain, but their medicinal property is very feeble, they should not, therefore, be employed in the preparation of the extract or tincture.

CHEMICAL PROPERTIES.—The medicinal virtues of the Indian hemp are due to the resin with which it is covered, and which has been named *cannabin*; this principle appears to be a peculiar resin developed on the plant in warm climates only. The herb contains also a small quantity of volatile oil, which has not been examined. The dried resinous tops of the plant yield to alcohol about 20 per cent. of resinous extract, which is of a dark reddish-brown colour; has a rather fragrant, narcotic odour, resembling that of *Canaster tobacco*; and a bitter, somewhat acrid taste. The *churrus* which has been brought from India, has an odour and taste nearly similar to that of the well prepared extract.

Adulterations.—Several specimens of the extract of Indian hemp which I have met with, did not possess the peculiar odour or taste of the extract as prepared under my own direction; whether this arose from faulty preparation, or the substitution of some other substance, I cannot say. The true extract is readily known by its peculiar odour and taste.

THERAPEUTICAL EFFECTS.—Although the Indian hemp has been used in Persia, throughout India, and in Africa, for many hundred years, for producing inebriation, and also as a medicinal agent; it has only been recently introduced into British medicine, through the exertions of Dr. O'Shaughnessy, of Calcutta. In its action on the system it is decidedly narcotic, producing at first the effects of a powerful stimulant, which if the dose taken be sufficiently large, are soon followed by those of a direct sedative. The preparations of the Indian hemp have chiefly been employed in the treatment of neuralgic and painful affections; in most of which they have proved

very beneficial. Thus, they have been given in tetanus, hydrophobia, infantile convulsions, sciatica, chorea, neuralgic pains, and chronic rheumatism; they have also been used to subdue sleeplessness or disturbed rest, provided it does not arise from inflammation in the head. All who have tried the effects of this remedy in the British Isles, have come to the conclusion, that the Indian hemp must be given in much larger doses in this country than in the East, and on his return home this was acknowledged by Dr. O'Shaughnessy himself. The trials made with it in the diseases above enumerated, would seem to show, that the *Cannabis Indica* may be often used with benefit, as a substitute for opium, in cases for which that drug is unsuited from idiosyncrasy or any other cause; and also that it does occasionally succeed in abating, sometimes in completely removing, pain, where this agent totally fails us. But the conclusion which an impartial observer must draw from the numerous cases in which Indian hemp was used as a remedy, which have been made public since the first edition of this book was published, is that it is an exceedingly uncertain medicine, producing the most manifest narcotic symptoms in some individuals, and in others the very same preparation appearing to be perfectly inert: and my own experience of its use fully justifies this conclusion; yet this may to a certain extent depend on the bad preparations of it that were commonly sold—a defect which now that it has become an officinal drug in the last Dublin Pharmacopœia will not be so likely to occur. In consequence of its stimulating properties, the use of Indian hemp is contra-indicated in acute inflammatory diseases.

DOSE AND MODE OF ADMINISTRATION.—The officinal preparations of the drug, are the purified extract, and a tincture; the mode of purifying the extract has been given above; the dose of it is gr. $\frac{2}{3}$, gradually increased to gr. iv. or gr. v., until a tendency to coma is produced, its effects being carefully watched; gr. ss. to gr. iss. is the dose usually given in the East, and this quantity frequently produces marked symptoms. It is best given in the form of pill.—*Tinctura Cannabis Indicæ*, D. (Take of purified extract of Indian hemp, half an ounce; rectified spirit, half a pint: dissolve the extract in the spirit). Each f3j. contains about two grains and 3-4ths of a grain of the extract. Dose, min. xx. to f3j. frequently repeated until the desired effect is produced. This tincture is decomposed by water, the resin being precipitated in the form of a pale yellow powder. It should therefore be suspended in aqueous vehicles, by means of mucilage, syrup, or yolk of egg.

HYOSCYAMUS, E. HYOSCYAMUS NIGER, FOLIA (ET SEMINA, L.), D. L. *Henbane; the leaves (and seeds, L.) of Hyoscyamus niger.* An indigenous plant, belonging to the Natural family *Solanaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Annual or biennial; Stem, much branched, rounded;

Leaves, subovate, amplexicaul, sinuate; Flowers, nearly sessile, dingy yellow with purplish veins; Capsules, 2-celled, many-seeded, when the seeds are ripe the upper part falling off like a lid; the whole plant is covered with unctuous fetid hairs.

PREPARATION.—The leaves of the biennial plant should be preferred; they are to be gathered when the plant is in full flower, and dried quickly at a temperature not above 120°. The seeds are contained only in the London Pharmacopœia; they should be collected when fully ripe.

PHYSICAL PROPERTIES.—*Hyoscyamus* leaves, when carefully dried, are of a greenish-yellow colour, have a clammy feel, a fetid, narcotic odour, and a bitter nauseous taste; in the fresh state, the odour and taste are similar but more powerful, and the colour is dull green. The seeds are ovoid, compressed, rough, of a brownish-yellow colour; they have a feeble narcotic odour, and a bitter, somewhat acrid taste.

CHEMICAL PROPERTIES.—*Hyoscyamus* leaves contain a narcotic extractive soluble in water and alcohol, bitter extractive, gummy extractive, and salts of magnesia, (Lindbergson). M. Brandes announced the discovery of a vegetable alkaloid, which he named *hyoscyamia*, in the leaves and seeds of the *Hyoscyamus niger*, but his statements have not been confirmed by more recent experiments. Runge has, however, shewn that this was owing to the employment of a caustic alkali to separate it; and by using magnesia for this purpose he has obtained vegetable alkalies from belladonna, henbane and stramonium, the three of which resemble each other so closely, that there is reason for believing that they are identical. Geiger and Hesse have obtained the alkaloid from the seeds in tufts of transparent silky needles, rather sparingly soluble in water, but freely soluble in alcohol and ether. According to the analysis of Kirshoff, the seeds consist of 28·3 per cent. of volatile and narcotic matter, 15·6 per cent. of fixed oil with some resin, 2·3 per cent. of extractive, with sugar, gum, lignin, albumen, and some salts. The leaves and seeds of the henbane impart their virtues to water, alcohol, ether, and the fixed and volatile oils.

Adulterations.—The admixture of any other leaves with those of the *Hyoscyamus niger* may be readily detected by their physical properties. The leaves lose much of their activity by keeping, they should therefore be gathered every year. When henbane is badly preserved, the odour and taste is very feeble.

THERAPEUTICAL EFFECTS.—Taken in large quantity, every part of this plant acts as a powerful narcotico-acrid poison, producing delirium, followed by sopor with marked dilatation of the pupil, which, if active treatment be not immediately employed, is the precursor of death. In medicinal doses, its operation is narcotic; but it is distinguished from most other medicines of this class by several peculiarities. Thus, the preliminary or stimulant stage of its operation, even when taken in small doses frequently repeated, is very slight, often not at all discernible; and in the second stage of its operation, it causes sleep, rather by lessening excitability and allaying pain, than by any direct action on the nervous system; under its

continued use, the bowels also, are gently acted on, and do not become constipated, as occurs when opium is taken. In consequence of these properties, hyoscyamus is employed with much advantage in many painful diseases in which from any circumstance the use of opium is objectionable. It is especially found beneficial in sleeplessness, or irritability, when the symptoms of pyrexia, as hot skin, thirst, delirium, &c., are present; in all forms of neuralgic and spasmodic affections where there is great excitability of the nervous system, and in which the stimulating effects of opium would prove injurious; in irritation of the bronchial mucous membrane causing cough; and in diseases of the urinary organs. There are, however, many persons in whom hyoscyamus produces great excitement, headache, and even delirium; and in such its use should be carefully avoided. Given in combination with active cathartics, it corrects their griping qualities without diminishing their activity. Externally, fomentations or cataplasms of hyoscyamus are employed to diminish pain in glandular enlargements, painful ulcerations, hemorrhoidal affections, &c. The best preparation for this purpose is the oil of hyoscyamus of the Parisian Codex, the formula for preparing which, will be found in the next paragraph.

DOSE AND MODE OF ADMINISTRATION.—In powder the leaves may be given in doses of gr. v. to gr. x.; or the seeds in doses of gr. iij. to gr. viij.; the following preparations, however, are generally employed:—*Extractum Hyoscyami*, D. L. E. (“Take of fresh hyoscyamus leaves, collected when the plant begins to flower, any convenient quantity: the method of preparation is the same as for *Extractum Belladonnæ*,” D.—“Prepared in the same manner as the similar preparation of belladonna,” L.—“To be prepared by any of the processes directed for extract of conium,” E.). The continued evaporation by heat to which this extract is subjected, when prepared according to the formulæ of the Dublin and London Colleges, impairs its activity; prepared according to the Edinburgh Pharmacopœia it is much more powerful. Dose, gr. v. to gr. xv., given in the form of pill.—*Tinctura Hyoscyami*, D. L. E. (Henbane leaves, dried (and in coarse powder, D., in moderately fine powder, E.), 3v.; proof spirit, Oij.; macerate (digest, E.) for 14 (7, E.) days, and strain (strain, express, and filter, D.): “It is best prepared by the process of percolation, as directed for the tincture of capsicum,” E.). Dose, f3ss. to f3ij.—*Succus Hyoscyami*, (Fresh hyoscyamus leaves, any quantity; express the juice with a powerful press, set aside for 48 hours, pour off the clear supernatant liquor, and add to it a fifth part of rectified spirit). This is the best preparation of henbane. Dose, min. xx. to min. xl.—*Oleum Hyoscyami*, P. (Fresh hyoscyamus leaves, 500 parts; olive oil, 1000 parts; bruise the hyoscyamus, mix with it the oil, and heat over a very gentle fire until all the water is evaporated; then digest for two hours, and strain with expression). Used only as an external application.

INCOMPATIBLES.—The vegetable acids; nitrate of silver; and acetate of lead.

In poisoning with hyoscyamus, stimulating emetics and the stomach pump should be immediately employed, to be followed by external and internal stimulants, and afterwards blood-letting. Several cases of poisoning with henbane have been published in the Italian journals, in which lemon-juice in large quantity proved a complete antidote.

LACTUCARIUM, D. L. E. LACTUCA SATIVA, FOLIA, D. LACTUCA VIROSA, FOLIA, D. *Lactucarium*; *Lettuce-opium*; *The inspissated juice of Lactuca sativa*—and *Lactuca virosa*, D. E.—of *Lactuca sativa*, L. *The leaves of Lactuca sativa*, and *Lactuca virosa*, D. Both these species of *Lactuca* belong to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnæan class and order *Syngenesia Æqualis*. The former, though extensively cultivated in the British Isles, was originally introduced probably from the East; the latter is indigenous. *Lactucarium* may also be obtained from the *Lactuca scariola* and *Lactuca sylvestris*, and according to Auberger the best is procured from the *Lactuca altissima*.

BOTANICAL CHARACTERS.—*Lactuca sativa* is an annual; Stem, erect, smooth, cylindrical, branching above, 1-2 feet high; Leaves, rounded, or ovate, more or less wrinkled, generally sheathing at the base, of a pale green colour; Flowers, pale-yellow, small, in terminal corymbs.—*Lactuca virosa* is a biennial; Stem, erect, prickly, 3-4 feet high; Leaves, distant, patent, oblong, toothed, two-eared and amplexicaul at the base, their keel prickly; Flowers, small, yellow, in panicles.

PREPARATION.—As soon as the flowering stem of either of these plants shoots up, it abounds in a white milky juice, which did not before exist; this juice, when dried spontaneously, constitutes *lactucarium* or *lettuce-opium*. It is obtained by slicing off the flowering head, before the flowers expand, collecting the milky juice which exudes, and removing a fresh slice of the stem as long as it yields any white juice. The recent investigations of Mr. Duncan of Edinburgh, have shown that the *Lactuca virosa* yields three times as much *lactucarium* as the garden lettuce, and that its quality also is superior. The milky juice exists in the leaves as well as in the flowering stem of the wild but not of the garden lettuce; I therefore do not know on what grounds the latter have been introduced into the list of *Materia Medica* of the last Dublin pharmacopœia, and the stem excluded.

PHYSICAL PROPERTIES.—It is met with in large, roundish, rough masses, of an umber-brown colour; it has a narcotic odour, which closely resembles that of opium, and a disagreeable, bitter taste.

CHEMICAL PROPERTIES.—*Lactucarium* consists of a peculiar neutral bitter crystalline principle (*Lactucin*), mannite, asparagine, a crystallizable matter which colours the persalts of iron green, an electro-negative resin combined with potash, a simple resin, wax, myricine, ulmic acid, pectin, albumen, numerous salts, (Auberger). Of these the *Lactucin* is the active principle; it appears to be to *lactucarium* what morphia is to opium; it is slightly soluble in cold but more so in boiling water, it is also soluble in alcohol, but is insoluble in ether. By heat *lactucarium* softens, and is partially fused; it is inflammable, and burns with a white flame. It yields

its virtues partially to cold or boiling water, but more completely to alcohol.

THERAPEUTICAL EFFECTS.—Lactucarium, in its operation on the system, resembles opium in many respects, but it produces scarcely any excitement, consequently it may be employed as a substitute for that drug in cases in which a stimulant effect is objectionable. It is, however, uncertain in its operation, and in many persons even when given in very large doses does not produce any effect. It has been principally employed as an anodyne in phthisis, but when its use has been continued for even a comparatively short period, I have found it to lose its powers of producing rest, although the quantity given was much increased. Lactucarium has also been employed as a narcotic in febrile and inflammatory affections, in rheumatism, in arthritis, and in nervous disorders, where opium is contra-indicated from any cause.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xx. in the form of pill.—*Tinctura Lactucarii*, E. (Lactucarium in fine powder, ʒij.; proof spirit, Oj.; this tincture is best made by percolation as directed for tincture of myrrh; but may also be prepared by digestion with coarse powder of lactucarium). Dose, fʒj. to fʒij. Every fluid-drachm of this tincture contains gr. vj. of lactucarium.—*Trochisci Lactucarii*, E. (To be prepared with lactucarium, in the same proportion, and in the same way as opium lozenges). Dose, ʒj. to ʒij. daily. Each lozenge of ten grains contains nearly one-seventh of a grain of lactucarium.—*Extractum Lactuce*, L. (Fresh lettuce leaves, lbj.; bruise them, sprinkled with a little water, in a stone mortar; then press out the juice, and evaporate it unstrained to a proper consistence). A bad preparation, sometimes substituted for lactucarium; from which it may be known by its greater compactness, and very feeble odour. Dose, ʒj. to ʒj.

LUPULINA, D. *Lupulin*; the yellow powder separated from the strobiles of *Humulus lupulus* by rubbing and sifting.

LUPULUS, L. E. **HUMULUS LUPULUS**, STROBILI SICCATI, D. *Hops*. The dried Strobiles (Catkins, E.) of *Humulus lupulus*. Scarcely indigenous, probably introduced from Holland; it belongs to the Natural family *Urticaceæ* (*Cannabinaceæ*, Lindley), and to the Linnean class and order *Diœcia Pentandria*.

BOTANICAL CHARACTERS.—Stems, long, weak, and climbing, scabrous; Leaves, petiolate, 3-5 lobed, serrated, veiny, rough; Flowers, greenish-yellow.

PREPARATION.—The aggregated fruits, *catkins* or *strobiles*, when dried, constitute the hops of commerce; they are gathered in September, picked and dried in kilns.

PHYSICAL PROPERTIES.—Hops occur in the form of thin, papery, greenish-yellow scales, variously veined, and sprinkled with a golden-yellow powder; they have a peculiar aromatic odour, and an aromatic, very bitter taste.

CHEMICAL PROPERTIES.—The principal virtue of hops is due to the yellow powder, which has been called *lupulin*; it constitutes about a sixth part of good hops, and may be readily obtained in a separate state by rubbing and sifting, as directed by the Dublin College. The scales are composed of astringent matter, inert colouring matter, chlorophylle, gum, lignin, and salts of potash and lime, with some adhering *lupulin*, (Payen and Chevallier). *Lupulin* is in the form of a coarse yellow powder, of a cellular texture; it consists of 2 per cent. of volatile oil, 10·3 of bitter principle (*lupulite*), 50 to 55 of resin, 32 of lignin, &c. Hops and *lupulin* yield their active properties to both water and alcohol.

THERAPEUTICAL EFFECTS.—Much difference of opinion exists as to the therapeutical properties of hops; they are generally stated to be narcotic, but from the experiments made with them by Magendie and others on animals, it would appear that this effect is not manifested when they are given internally, no matter how large the dose. Nevertheless, the inhalation of the aroma of hops acts decidedly narcotic, frequently producing sleep in the restlessness and watchfulness of mania and other nervous affections, when opium and other narcotics have completely failed: to produce this effect, a pillow stuffed with hops is generally employed. *Lupulin* has been more employed in the United States than in this country; and amongst the American physicians it bears the character of being a useful narcotic; Dr. Page of Philadelphia states that he has found it of especial value in chordee. The solution of the bitter principle of the hop in malt liquors serves to make them keep better, and also confers on them aromatic and tonic properties.

DOSE AND MODE OF ADMINISTRATION.—*Lupulin*, gr. vj. to gr. xij. in powder or pill; if the hop possesses any narcotic property, it must be concentrated in this substance, as in it alone is centred all the aroma.—*Extractum Lupuli*, L. E. (“Prepared as the extract of Logwood,” E.—“Hops, ℥ss.; boiling distilled water, cong. ij.; macerate for 24 hours: then boil down to a gallon, and strain the liquor while yet hot; lastly, evaporate to a proper consistence,” L.). Dose, gr. v. to gr. xx.—*Infusum Lupuli*, L. (Hops, 3vj.; boiling distilled water, Oj.; macerate for 4 hours in a vessel lightly covered and strain). A mild bitter, very feebly, if at all narcotic. Dose, f3j. to f3ij.—*Tinctura Lupulina*, D. *Tinctura Lupuli*, L. E. (“Take of *lupulin*, five ounces; rectified spirit, two pints. Macerate for fourteen days, strain, express, and filter,” D.—“Hops, 3vj.; proof spirit, Oij.; macerate for 14 days and strain,” L.—“Take any convenient quantity of hops recently dried, separate by friction and sifting the yellowish-brown powder attached to their scales; then take, of this powder, 3j.; and of rectified spirit, f3viij.; and prepare the tincture by percolation or digestion as directed for tincture of Capsicum,” E.). Dose, f3ss. to f3ij.

INCOMPATIBLES.—Mineral acids; and the salts of iron, lead, mercury, and silver.

MORPHIA, D. L.—*Morphia. A peculiar principle on which the medicinal activity of opium chiefly depends.*

PREPARATION.—*Dublin.*—"Take of Turkey opium, cut into thin slices, one pound; distilled water, six pints; chloride of calcium, six drachms; prepared animal charcoal, as much as is sufficient. Macerate the opium for twenty-four hours with a quart of the water, and decant. Macerate the residuum for twelve hours with a second quart of the water, decant, and repeat this process with the rest of the water, subjecting the insoluble residuum to strong expression. Let the decanted solutions and expressed liquor be evaporated by a steam or water heat to the bulk of one pint, and then passed through a calico filter. Pour in now the chloride of calcium, first dissolved in four ounces of distilled water, and then proceed with the evaporation until the solution is so far concentrated, that upon cooling nearly the whole of it becomes solid. Let this solid matter be enveloped in a couple of folds of strong calico, and subjected to powerful pressure, the dark liquid which exudes being reserved for subsequent use. The squeezed cake is now to be acted upon with about half-a pint of boiling water, and the whole being thrown upon a paper filter, the precipitate must be well washed. The filtered solution having been evaporated as before, cooled and solidified, the residue is to be again subjected to expression. If the product be not quite white, this process should be repeated a third time, the liquid forced out during expression being always preserved. Let the squeezed cake be dissolved in six ounces of boiling water, and, if necessary, cleared by filtration through prepared animal charcoal, the portion of it soaked by the filter being carefully washed out of it; and to the solution thus obtained let water of ammonia be added in slight excess, and let the crystalline precipitate which forms when the liquor has cooled be collected on a paper filter, and washed with cold distilled water until the washings cease to give a precipitate upon being dropped into an acid solution of nitrate of silver. Lastly, let the filter be transferred to a porous brick, in order that the morphia it contains may become dry. The liquids separated by expression from the muriate of morphia, in the preceding process, having been diluted with water, so as to occupy the bulk of four ounces, and then supersaturated slightly with ammonia, let the precipitate which forms be collected, after the lapse of six hours, on a filter, and washed with a little cold water. This, if redissolved in dilute muriatic acid, boiled with a little animal charcoal, and filtered, will, upon cooling, afford a crystalline deposit, from which, when pressed, dissolved in water, and supersaturated with ammonia, an additional quantity of morphia will be procured." *London.*—"Hydrochlorate of morphia, $\mathfrak{z}\text{j}$.; solution of ammonia, $\mathfrak{f}\mathfrak{3}\text{v}$.; distilled water, Oj .; add the hydrochlorate of morphia, first dissolved in the pint of water, to the solution of ammonia with an ounce of water, shaking them together; wash what is thrown down with distilled water, and dry with a gentle heat."

PHYSICAL PROPERTIES.—Thus obtained, morphia is in the form of a white crystalline powder, the crystals being very minute; but by solution in boiling alcohol and slow evaporation, they may be obtained much larger; their primary form is the right rhombic prism. They are inodorous but have a sensibly bitter taste.

CHEMICAL PROPERTIES.—Morphia in the crystalline state consists of $\text{C}^{34} \text{H}^{20} \text{O}^6 \text{N} + 2\text{HO}$. It is permanent in the air, is fused by heat, and by a high temperature is decomposed. It is inflammable, burning with a bright flame and a peculiar odour, and leaving a carbonaceous residuum. It requires 1000 parts of water to dissolve it, the solution possessing an alkaline action; it is scarcely soluble in ether, but dissolves in 40 times its weight of cold and in 30 times its weight of boiling alcohol; it is very soluble in solution of caustic potash, soda, or lime water, and but feebly so in ammonia. The best characteristic of morphia and its salts is the property which

they possess of striking a deep blue colour with the solution of a persalt of iron made as nearly neutral as possible.

THERAPEUTICAL EFFECTS.—Morphia, on account of its insolubility, is not used in medicine; its therapeutical effects, therefore, will be more conveniently considered when treating of the muriate of morphia, the most frequently employed of its salts. The dose of the pure alkaloid would be from one-fourth to one-half of a grain in the form of pill.

MORPHIÆ ACETAS, D. L. E. *Acetate of Morphia.*

PREPARATION.—*Dublin.*—"Take of morphia, in fine powder, one ounce; rectified spirit, eight fluid ounces; acetic acid of commerce (specific gravity, 1044), four fluid drachms and a half, or as much as is sufficient. Pour the spirit on the morphia, and, applying heat, gradually add the acetic acid until a neutral, or slightly acid solution is obtained. Let this be evaporated to the consistence of syrup, by a steam or water heat, and then set by for a few days, until it solidifies. In operations on the great scale it will be worth while to remove the spirit by distillation". *London.*—"Morphia, ʒvj.; acetic acid, fʒij.; distilled water, fʒiv.; mix the acid with the water, and pour them upon the morphia to saturation. Let the liquor evaporate with a gentle heat that crystals may be formed." *Edinburgh.*—"Muriate of morphia, any convenient quantity. Dissolve it in 14 times its weight of warm water; and when the solution is cool, add aqua ammoniæ gradually, and with constant agitation, until there is a permanent but faint odour of ammonia in the fluid. Collect the precipitate on a calico filter, wash it moderately with cold water, and dissolve it by means of a slight excess of pyroligneous acid in 12 parts of warm water for every part of muriate of morphia that was used. Concentrate the solution over the vapour bath and set it aside to crystallize. Drain and squeeze the crystals, and dry them with a gentle heat. More acetate of morphia may be obtained on concentrating the mother-liquor."

PHYSICAL PROPERTIES.—As usually met with, acetate of morphia is a greyish-white powder, sometimes obscurely crystalline; when pure, however, it is snow white and in distinct crystals. It is inodorous, but when moistened emits a feeble odour of acetic acid; its taste is intensely bitter.

CHEMICAL PROPERTIES.—It is composed of one equivalent of acetic acid and one of morphia. Exposed to the air it loses a portion of its acid, and is then partially insoluble in water; it is decomposed by heat, and dissipated without any residuum. Acetate of morphia is very soluble in water and in alcohol. When the base is not completely saturated with acid, its solution in water may be readily accomplished by adding a few drops of acetic acid.

Adulterations.—When the salt is properly prepared, it is of a snow-white colour, and readily soluble in water. The following test of the Edinburgh Pharmacopœia, which indicates the exact quantity of morphia that ought to be present, guards against the adulteration with any other white powder:—"One hundred measures of a solution of gr. x. in fʒss. of water, and min. v. of acetic acid, heated near to 212°, and decomposed by a faint excess of ammonia, yield by agitation a precipitate which in 24 hours occupies 15·5 measures of the liquid."

THERAPEUTICAL EFFECTS.—The uses of this preparation are precisely similar to those of the muriate to be next described; the latter salt should be always preferred, as it is more easily prepared, keeps better and is generally more pure.

DOSE AND MODE OF ADMINISTRATION.—Gr. $\frac{1}{4}$ th to gr. ss. in pill, or in solution as follows:—*Morphiæ acetatis liquor*, D. (Take of acetate of morphia, eighty-two grains; rectified spirit, five fluid ounces; distilled water, fifteen ounces. Having added the spirit to the water, dissolve the acetate of morphia in the mixture, and, if the solution is not quite clear, pass it through a paper filter). The strength of this preparation is intended to be equivalent to tincture of opium; f3j. contains $4\frac{1}{10}$ th grains of acetate of morphia; a f3j. containing a little more than gr. ss. Dose, min. xx. to min. xl. (See, *Morphiæ Murias*).—*Syrupus Morphiæ Acetatis*, D. (Take of solution of acetate of morphia, one fluid ounce; simple syrup, fifteen fluid ounces. Mix with agitation). A useless preparation; f3j. contains a little more than a fourth of a grain of the acetate.

INCOMPATIBLES.—The stronger acids; the alkalies, and alkaline earths; most earthy and metallic salts; and astringent vegetable infusions and decoctions.

MORPHIÆ MURIAS, D. E. MORPHIÆ HYDROCHLORAS, L. *Muriate of Morphia; Hydrochlorate of Morphia.*

PREPARATION.—*Dublin.*—"Take of morphia, in fine powder, one ounce; pure muriatic acid, four fluid drachms and a-half, or a sufficient quantity; distilled water, two ounces and a half. Mix the acid with the water, heat to about 200° , and add the morphia, constantly stirring, so that a solution may be formed having a slightly acid reaction. Set this to cool for twelve hours, and let the crystals which separate be drained of the liquor which surrounds them, and dried on blotting-paper. The decanted liquor will, by further concentration and cooling, give additional crystals."
London.—"Take of opium, sliced, lbj.; crystals of chloride of lead, 3ij., or a sufficiency; purified animal charcoal, 3iiss.; hydrochloric acid; distilled water, solution of ammonia, each, as much as may be sufficient; macerate the opium in Oiv. of distilled water for 30 hours, and bruise it; afterwards digest it for 20 hours more and press it. Macerate what remains again and a third time in water, that it may become free from taste, and as often bruise and press it. Evaporate the mixed liquors, with a heat of 140° , to the consistence of a syrup. Then add Oijj. of distilled water, and when the impurities have subsided pour off the supernatant liquor. Gradually add to this 3ij. of chloride of lead, or as much as may be sufficient, first dissolved in Oiv. of boiling distilled water, till nothing further is precipitated. Pour off the liquor and wash what remains frequently with distilled water. Then evaporate the mixed liquors as before, with a gentle heat, that crystals may be formed. Press these in a cloth, then dissolve them in a pint of distilled water, and digest with 3iss. of animal charcoal, in a heat of 120° , and strain. Lastly, the charcoal being thoroughly washed, evaporate the liquors cautiously that pure crystals may be produced. To the liquor poured off from the crystals first separated, previously mixed with a pint of water, gradually drop in as much solution of ammonia, frequently shaking it, as may be sufficient to precipitate all the morphia. To this washed with distilled water, add hydrochloric acid that it may be saturated; afterwards digest it with 3ij. of animal charcoal, and strain. Lastly, the animal charcoal being thoroughly washed, evaporate the liquors cautiously, that pure crystals may be produced." *Edinburgh.*—"Take of

opium, ℥xx. ; water, Oviij. ; muriate of lime, ℥j., or a slight excess ; macerate the opium in fragments for 24 hours in Oij. of the water ; and separate the infusion, squeezing well the residue. Repeat the maceration successively with Oij. more of the water, till the whole is made use of. Concentrate the whole infusions over the vapour-bath. Decant the clear liquid, and add the muriate of lime dissolved in f℥iv. of water. Set the whole aside to settle ; pour off the liquid ; wash the sediment with a little water, adding the washings to the liquid. Evaporate the liquid sufficiently in the vapour-bath for it to solidify on cooling. Subject the cooled mass to very strong pressure in a cloth ; redissolve the cake in a sufficiency of warm distilled water ; add a little fine powder of marble, and filter ; acidulate the filtered fluid with a very little muriatic acid ; and concentrate a second time in the vapour-bath for crystallization. Subject the crystals again to very strong pressure in a cloth. Repeat the process of solution, clarification by marble and muriatic acid, concentration and crystallization, until a snow-white mass be obtained.—On the small scale trouble and loss are saved by decolorizing the solution of muriate of morphia by means of a little purified animal charcoal after two crystallizations. But on the large scale it is better to purify the salt by repeated crystallizations alone, and to treat all the expressed fluids, except the first, in the same way with the original solution of impure muriate of morphia. An additional quantity of salt may often be got from the first dark and resinous fluid obtained by expression, on merely allowing it to remain at rest for a few months, when a little muriate of morphia may be deposited in an impure condition.—The opium which yields the largest precipitate by carbonate of soda, according to the formula for testing opium, will yield muriate of morphia, not only in the greatest proportion, but likewise with the fewest crystallizations.”

PHYSICAL PROPERTIES.—Muriate of morphia is usually met with in the form of a fine, soft, snow-white powder, but it may readily be obtained in feathery, acicular crystals. It is without odour, but has an intensely bitter, peculiar taste.

CHEMICAL PROPERTIES.—It is composed of one equivalent of hydrochloric acid, one of morphia, and (in the crystalline state) six of water of crystallization. It is permanent in the air, is fusible by heat, and by a red heat is decomposed and totally dissipated. Muriate of morphia requires for its solution from 14 to 20 parts of cold water, but is soluble in less than its own weight of boiling water ; it is also readily dissolved by alcohol.

Adulterations.—The chief impurities which are at present commonly met with in this salt are colouring matter and moisture, both of which arise from faulty preparation ; recently, however, muriate of morphia has been adulterated with so much as 25 per cent. of white sugar, a serious fraud in so active and so important a medicine. The tests of the Edinburgh Pharmacopœia guard against these contaminations, as well as against the adulteration with any similar white powder.—“Snow-white ; entirely soluble ; solution colourless ; loss of weight at 212° not above 13 per cent. ; one hundred measures of a solution of gr. x. in f℥ss. of water, heated near to 212°, and decomposed with agitation by a faint excess of ammonia, yield a precipitate which in 24 hours occupies 12·5 measures of the liquid.”

THERAPEUTICAL EFFECTS.—Notwithstanding the observations of many, that morphia is free from the stimulating effects of opium, and that it acts purely as an anodyne sedative ; it would appear that it possesses essentially, though perhaps not quite identically, the

actions of the drug itself. Thus, given in small doses, its first effect is to cause a feeling of excitement of the circulation, and in some persons of the nervous system also; the stage of excitement, however, is never so distinctly marked as when opium has been taken, and sedative effects are more immediately consequent on it. Morphia and its salts will, in some persons, but not in so many individuals, produce the disagreeable subsequent feelings of nausea and head-ache caused by opium; but constipation, sweating, or dryness of the tongue, very rarely follow their employment. There are two effects produced by morphia and its salts, when taken in medicinal doses, which do not seem to be caused by opium, namely, a peculiar sensation of itchiness over the whole surface of the body, in some cases attended even with a cutaneous eruption; and irritability of the bladder, accompanied by a difficulty in voiding the urine; the latter symptom is most distinctly marked when any of the salts of morphia have been taken in full doses. The salts of morphia may be employed in most instances to fulfil the same intentions as opium and its preparations, which will be fully considered in the next article. We prefer their use to that of opium, where the drug itself is apt to disagree, when from any cause we wish to employ it without the knowledge of our patient, or where our intentions will be best answered by applying the remedy to the denuded dermis, as in certain local affections, especially those of a nervous character. The insertion of a few drops of a concentrated solution of muriate of morphia in creasote or in water, into the areolar tissue over the seat of the pain, has been practised with much success in the treatment of sciatica, tic douloureux and various neuralgic pains; an instrument for the purpose has been invented by Mr. Rynd of this city, and is manufactured by Messrs. Weiss of London, but it may be done nearly as effectually by means of a common lancet. Like opium, the salts of morphia lose their effect by repetition, and consequently the dose must be gradually increased.

DOSE AND MODE OF ADMINISTRATION.—The dose of the muriate of morphia is from gr. $\frac{1}{4}$ th to gr. ss.; after it or the acetate has been employed for any length of time, so large a dose as gr. viij. to gr. x. will be required to act as a narcotic. When applied endermically, the cuticle is to be removed by means of a blister, and gr. j. to gr. ij., sprinkled over the denuded dermis. The salts of morphia may also be introduced into the system by inoculation with a lancet dipped in their aqueous solution; the punctures may be made on the anterior part of the fore-arm, and the fourth of a grain thus introduced will generally be found to produce sleep.—*Morphiæ Muriatis solutio*, D. E. (Muriate of morphia, gr. xc.; rectified spirit, f3v.; distilled water, f3xv.; mix the spirit and the water, and dissolve the muriate of morphia in the mixture, “with the aid of a gentle heat,” E. “and unless the solution be quite clear, pass it through a paper filter,” D. The strength of this preparation is intended to be equivalent to tincture of opium; f3j. contains gr. ivss. of muriate of morphia. Dose, min. xx. to min. xl.—*Syrupus*

Morphiæ Muriatis, D. (Take of solution of muriate of morphia, one fluid ounce; simple syrup, seventeen fluid ounces. Mix with agitation). A useless preparation; there seems also to be some mistake in the proportions, for while the officinal solution of acetate of morphia is supposed to be of the same strength as that of the muriate, the syrup of the latter is more diluted. Each fluid ounce contains a fourth of a grain of the muriate of morphia.—*Trochisci Morphiæ*, E. (Muriate of morphia, ʒj.; tincture of tolu, ʒss.; pure sugar, ʒxxv.; dissolve the muriate of morphia in a little hot water, mix it and the tincture of tolu with the sugar, and with a sufficiency of mucilage form a proper mass for making lozenges, each of which should weigh about fifteen grains). Each lozenge contains a little more than a fortieth of a grain of muriate of morphia. Principally used to allay tickling cough in chronic pectoral affections. Dose, N° x. to xij. daily.—*Trochisci Morphiæ et Ipecacuanhæ*, E. (Muriate of morphia, ʒj.; ipecacuan, in fine powder, ʒj.; tincture of tolu, fʒss.; pure sugar, ʒxxv.: proceed as for *morphia lozenges*). Dose and uses the same. In addition to the morphia, each lozenge contains about a fourteenth of a grain of ipecacuanha.

INCOMPATIBLES.—Alkalies, and alkaline earths; most earthy and metallic salts; and astringent vegetable infusions and decoctions.

MORPHIÆ SULPHAS. *Sulphate of Morphia*. This salt of morphia is not often used in medicine in this country, but it bears a high character in America, and is officinal in the pharmacopœia of the United States. It may readily be prepared by mixing morphia in powder with distilled water and carefully adding diluted sulphuric acid till the morphia is saturated and dissolved. It occurs in snow-white feathery crystals which are completely soluble in water. It is composed of 1 equivalent of morphia, 1 of sulphuric acid, and 6 of water of crystallization. The dose is the same as that of the muriate, over which it does not appear to possess any advantage.

OPIUM, D. L. E.—*Opium*. Concrete juice obtained from the unripe capsules of *Papaver somniferum*. Probably originally a native of Asia, Egypt, and the south of Europe, but now growing wild and extensively cultivated in most parts of the world; it belongs to the Natural family *Papaveraceæ*, and to the Linnæan class and order *Polyandria Monogynia*.

BOTANICAL CHARACTERS.—Annual; Stem, erect, cylindrical, branched, glaucous-green, 2-6 feet high; Leaves, amplexicaul, alternate, undulated, incised, ovato-oblong, glaucous beneath; Flowers, large, terminal, pendulous before expansion, with two deciduous sepals, and four petals, generally white with a purple eye, some varieties red or dark-purple; Capsules, obovate or globose, smooth, many-seeded; Seeds, small, roundish or reniform, oily.

PREPARATION.—Opium is obtained from the capsules of the poppy by a nearly similar process in all parts of the world in which it is prepared:—A few days after the petals fall off, incisions are made horizontally and obliquely with some sharp instrument, through the epicarp and sarcocarp of the capsule, taking care not to penetrate the cavity. A white milky juice exudes in drops, which is allowed to remain on the poppy head for 24 hours. It is then scraped off, and deposited in earthen or wooden vessels, in which it is assiduously stirred until the different collections made are thoroughly inspissated, water being sometimes added to keep up the moisture. The opium is finally dried without heat, first in small cakes, afterwards in large masses, and in most places wrapped in poppy leaves to prevent them from adhering.

PHYSICAL PROPERTIES.—The opium met with most commonly, at present almost entirely, in British commerce, is called **TURKEY OPIUM**, and is principally brought from Smyrna, a small quantity occasionally coming direct from Constantinople. **SMYRNA OPIUM** occurs in irregularly rounded lumps, varying in weight from a few ounces to two or even three pounds, the most general size being from a pound and a half to two pounds. When first imported it is usually so soft as to be readily imprinted with the fingers, but it quickly becomes hard by keeping. Each lump is covered externally with the reddish winged seeds of some species of *Rumex*, and the inferior sorts usually with poppy leaves also; it is of a brownish colour, and has a waxy lustre when cut; its odour is strong and narcotic, and its taste bitter, acrid, and nauseous. **CONSTANTINOPLE OPIUM** occurs in small flattened cakes covered with a poppy leaf, but without any *Rumex* seeds. It is hard, and of a hair-brown colour; its odour and taste are more feeble than the preceding sort. **EGYPTIAN OPIUM** is also sometimes met with in the British market, but for some years it has been very scarce, in consequence of the demand for it being slight, owing to its inferior quality. It occurs in flattened round cakes, from 3 to 8 ounces in weight, each cake being wrapped up in a poppy leaf, with the midrib of which it is intended; it varies much in consistency, some pieces being very soft and others tolerably hard; but most of it attracts moisture from the air so as to become soft by keeping. It has a reddish brown colour; its odour and taste are comparatively feeble. **EAST INDIAN OPIUM** is not an article of British commerce, being prepared chiefly for the Chinese market. For specimens of the different sorts usually prepared, I am indebted to the kindness of Professor Christison of Edinburgh, and to Mr. Johnson, late assistant opium inspector at the great factory of Behar. Three kinds are commonly met with; **BENGAL OPIUM**, which includes that prepared at the factories of Behar and Benares, **GARDEN PATNA** and **MALWAH OPIUM**. *Bengal Opium* is met with in large round balls from three to four pounds weight, surrounded with a thick envelope of leaves firmly agglutinated together. The contained opium is quite soft and of a blackish colour; its odour and taste are purely opiate; it is now scarcely ever prepared, being superseded by the two following sorts, and specimens of it are consequently very rare. *Garden Patna Opium* occurs in flat square cakes from three to four inches square, and about half an inch thick; while still soft, it is closely enveloped in thin plates of mica, which firmly adhere to it.

It has a reddish-brown colour, homogeneous throughout, and a rather agreeable strongly opiate odour. *Malwah Opium* is in flattened round cakes, five or six inches in diameter; it is hard and brittle, covered externally with a coarse greyish dust, internally it is of a light brown colour, and has a shining fracture; its odour is much more feeble than that of Garden Patna Opium. Opium was also formerly prepared in England of very fine quality, but owing to the losses which were sustained from the uncertainty of our climate, the cultivation of the poppy with that intention is now quite abandoned. It is at present prepared in some parts of France, and of Germany, for the purpose of procuring morphia from it. A variety of opium, under the name of *Persian Opium*, is described as having been imported some years since from Trebizond on the Black Sea; it was in cylindrical sticks about six inches long, and half an inch in diameter, wrapped separately in paper; it was of a pale brown colour, had an opiate, somewhat musty odour, and an intensely bitter taste; it appeared to be a very inferior article. Opium has also been recently imported into France from the neighbourhood of Algiers; it is described as resembling closely the best specimens of Smyrna opium; and the cultivation of the poppy there for the purpose of supplying France with opium is at present in contemplation. Of the different varieties of opium above described, the finer qualities of Turkey opium should be preferred for medical purposes.

CHEMICAL PROPERTIES.—According to the most recent, as well as the most complete analyses that have been made of opium, the substances of which it is composed appear to be the following:—*Morphia*, *codeia*, *narcotina*, *thebaina* or *paramorphia*, *narcein*, *meconin*, *porphyroxin*, *meconic acid*, *sulphuric acid*, *gum*, *albumen*, *resin*, *fixed oil*, *a trace of volatile oil* (its odorous principle), *lignin*, *caoutchouc*, *extractive matter*, and *numerous salts of inorganic bases*. The first eight are peculiar principles found only in opium; they may be conveniently classed as follows, with respect both to their chemical and physiological properties:—

SUBSTANCES.	MEDICINAL PROPERTIES.
1.—ALKALOIDS.	
Morphia (C ³⁴ H ²⁰ O ⁶ N).....	Narcotic.
Codeia (C ³⁶ H ²¹ O ⁶ N).....	Narcotic.
Narcotina (C ⁴⁶ H ²⁷ O ¹⁴ N).....	Bitter; resembling Quina.
Thebaina (C ²⁵ H ¹⁴ O ³ N).....	Stimulant; resembling Strychnia.
2.—NEUTRALS.	
Narcein (C ²⁸ H ²⁰ O ¹² N).....	Inert.
Meconin (C ¹⁰ H ⁵ O ⁴).....	Inert.
Porphyroxin.....	Inert.
3.—ACID.	
Meconic Acid (C ¹⁴ H O ¹¹).....	Inert.

The constituents of opium are partially soluble in water, either

warm or cold, about a third being left undissolved, which consists chiefly of a dark viscid substance resembling caoutchouc, and narcotin; it is more soluble in alcohol and ether, but a small portion is still left undissolved. The watery infusion is of a dark brown colour, and has an acid reaction. It is precipitated by the alkalies, and alkaline earths when not added in excess; by the soluble salts of iron and of lead, by the salts of lime and magnesia, by tincture of galls, and by all astringent vegetable matters. Of the different substances above enumerated as existing in opium, the only one of importance in relation to medicine is *morphia*, which has been before described; it exists in opium combined with meconic and sulphuric acids. *Codeia* has been used in France by Magendie and others as a narcotic; it is about half the strength of *morphia*. *Narcotina* was at one time generally believed to be the stimulating principle of opium; but more recent investigations, especially those of Dr. O'Shaughnessy of Calcutta, have shown that it is completely devoid of any stimulant or narcotic properties, and that like quina, it is capable of arresting the paroxysms of remittent and intermittent fevers; more than 160 cases of ague successfully treated with *narcotina* by himself and others have been recently published by that physician. *Thebaina*, from Magendie's experiments, appears to be a powerful poison, one grain injected into the jugular vein or placed in the pleura acts like strychnia, causing tetanus and death in a few minutes. *Meconic acid* produces a deep cherry-red colour with the persalts of iron; and this forms the most important characteristic of opium in medico-legal researches.

Adulterations.—Opium is very extensively adulterated, and also varies exceedingly in quality, in consequence of the mode in which it is prepared. Many of the impurities which exist in opium may be detected by a careful physical examination: such as moisture, sand, stones, leaves, woody fibre, pieces of metal, seeds, &c. But by external characters it is very difficult to judge accurately of the quality of opium, and the only sure criterion is to ascertain the quantity of *morphia* contained in a given specimen of the drug, which may be effected by the process of the Dublin pharmacopœia for preparing the alkaloid; or by proceeding according to the processes of either the London or Edinburgh pharmacopœia for the preparation of muriate of *morphia*. "A pound of good opium treated according to the Edinburgh process should yield at least ten per cent. of snow-white salt," (Christison). The following test for the goodness of opium given in the Edinburgh Pharmacopœia is intended to indicate the quantity of *morphia*, *narcotina*, and resinous extractive contained; but it is difficult of application, and at best can be only a doubtful criterion of quality: "A solution from 100 grains of fine opium macerated 24 hours in f3ij. of water, filtered and strongly squeezed in a cloth, if treated with a cold solution of 3ss. of carbonate of soda in two waters, yields a precipitate which weighs when dry at least ten grains, and dissolves entirely in solution of oxalic acid." The following process proposed by M. Payen is one

easy of execution and sufficiently accurate for most pharmaceutical purposes:—3viss. of opium are cut into very thin slices and left to macerate for 24 hours in f3v. of pure water; then triturated in a mortar till the hydrated matter becomes clear, when the most finely divided parts which the liquid holds in suspension are decanted on a filter. Water is added to the residue which is again triturated, and the whole poured on the same filter and washed with distilled water until the liquor passes through colourless. Recently slaked lime is added in excess to the filtered solution, and the mixture boiled for five minutes and filtered. To the filtered solution sufficient pure hydrochloric acid is added to saturate the lime and combine with the morphia. The morphia is precipitated by ammonia, collected on a filter and washed; it is then dissolved in rectified spirit and crystallized, and the crystals washed with ether to remove the narcotina. The residue, which is tolerably pure morphia, is washed and dried, and then weighed. Good opium thus treated yields from 4 to 5 per cent.

THERAPEUTICAL EFFECTS.—In excessive doses, opium is a powerful narcotic poison, producing giddiness and stupor with scarcely any previous excitement, soon after it is taken; the stupor increases rapidly, accompanied by complete torpor, slowness of breathing, depressed circulation, general relaxation of the muscles, and contracted pupils; and unless active treatment be speedily employed, death quickly ensues. In medicinal doses, opium generally produces at first excitement of the vascular system, which is accompanied by exhilaration of the nervous functions; these effects are marked by an increase in the force and frequency of the pulse, with increased heat of the body, and by the pleasurable sensations which are experienced throughout the whole system. Soon after, unless the dose be repeated, the sedative influence of the drug becomes obvious; the general excitement is calmed, pain is diminished, a disinclination to muscular exertion produced, and the force of external impressions on the senses diminished; this state is succeeded by sleep more or less profound, which lasts usually from six to eight hours. On awaking from the sleep produced by opium, nausea, head-ache, loss of appetite, and indisposition to any active exertion are very generally experienced. The effects of opium are modified by a variety of circumstances, but most remarkably of all by habit. This is well exemplified by a reference to the customs of some Eastern countries, as Turkey, Persia and China, where the drug is commonly employed to produce a species of intoxication or excitement. In the two former countries the opium is eaten, in the latter it is smoked, but in either way the quantity used must be increased daily or it ceases to produce the desired effect. Instances of opium-eating occur also constantly in the British Isles; and a graphic account of the effects produced by its pernicious habit as experienced by himself, is given by Mr. De Quincy in his *Confessions of an English Opium-eater*. Amongst the Turks, the *Theriaci* (opium-eaters) generally begin with doses of from one to two or three grains, and increase the

quantity gradually till it amounts to two, three, or in many instances to six drachms. In this country, also, it is taken in immense quantities by opium-eaters, f3iij. of laudanum being a common daily allowance, and in some instances, where the vice has been long indulged in, half a pint to a pint is the quantity taken. These facts should be borne in mind by the medical practitioner, as opium-eaters when labouring under disease require of course very large doses of the drug; and in all individuals, where the use of opium has been continued for any length of time, the dose must be gradually increased. We also occasionally meet with individuals on whom, although unaccustomed to its use, opium produces but little effect. Christison mentions an instance of "a gentleman of his acquaintance, who, though not accustomed to its use, has taken 450 drops of the best laudanum without any other effect than some head-ache, and constipation; and singularly enough, his son at the age of six took 60 minims of solution of muriate of morphia without any apparent effect." In others, we see a very opposite state of sensibility to the operation of this drug, the sixth or eighth of a grain being a sufficient dose; this extreme sensibility to the action of opium is almost invariably met with in infants and young children; we should therefore employ opiates with great caution in the treatment of their diseases, one drop of laudanum frequently proving a dangerous dose to a child a few weeks old. The effects of opium are also much influenced by disease, as will be evident when I come to speak of the special uses of the drug. Lastly, by combination with other remedies the operation of opium is greatly modified. Thus, with antimonials or ipecacuanha, its narcotic influence is much diminished, and the diaphoretic powers of these substances remarkably increased; with astringents, as catechu, kino, or chalk, their powers are augmented without the production of narcotism; and with aromatics or camphor, the stimulant effect of the drug is in general only manifested.

The special uses of opium in the treatment of disease are so very numerous, that we can only subjoin a concise account of the most important of them; mentioning the peculiar circumstances by which its employment is demanded, or contra-indicated. In *fevers*, opium is principally used to procure sleep where there is great watchfulness or delirium present, without excitement of the vascular system, or where they continue, after that excitement has been subdued by antiphlogistic treatment. Its effects, however, must be carefully watched, and its use should not be persisted in if the tongue and skin become dry, or if the pupil of the eye be contracted. The combination of tartar emetic with opium, as first proposed by Dr. Graves of this city, will often be found particularly useful in fevers attended with much cerebral disturbance. In the *eruptive fevers*, opium when given with due attention to the concomitant symptoms is productive of much benefit, nay, is sometimes imperatively demanded for the safety of the patient; about the eighth or ninth day of the eruption in small-pox, great cerebral disturbance frequently

comes on, at first marked by throbbing of the carotids; if opium be not administered immediately on the appearance of this symptom, it is quickly followed by delirium, coma, and death. In *intermittent fever*, opium given in a large dose at the commencement of the cold stage frequently arrests the paroxysm; if there be any local inflammation or congestion present, its use is contra-indicated. In *inflammatory diseases*, given in conjunction with calomel, it acts as a powerful antiphlogistic; one grain of opium with two or three of calomel administered every four or five hours, will be often found a remedy of much power in the inflammations of *membranous* parts; it does not, however, prove so useful in the inflammation of the *parenchymatous structure* of organs. In *diffuse inflammation*, particularly that fatal form of it which is accompanied by *periostitis*, opium proves more successful than any other remedy which has been employed: it is best given alone in doses of from a quarter of a grain to half a grain every hour or every second hour. Its beneficial influence in this affection depends upon its power of lessening "irritability," and thereby enabling the system to bear up against the disease. After a copious bleeding, at the very commencement of an acute attack of *gastritis*, *enteritis*, *peritonitis*, *cystitis*, &c., a full opiate, 60 to 80 drops of the tincture, or from 2 to 3 grains of solid opium, will often arrest the further progress of the disease. In *peritonitis* caused by rupture of the stomach or intestinal canal, life can be prolonged for even a short period only by the use of very large doses of opium. In *rupture of the uterus*, given immediately and freely, opium has in some instances saved the life of the patient; in the treatment of uterine hemorrhage it also proves very beneficial, even when the bleeding proceeds from organic disease. In *acute rheumatism*, when given as first proposed by Dr. Corrigan, it is productive of the happiest results; to prove useful in this disease, it must, however, be administered freely, one grain at first every second hour, and after a few doses every hour, and this treatment continued for five or six days, or until the disease is subdued; thus given, it does not cause either dryness of the tongue, head-ache, or constipation; the duration of the attack is shortened; and the dangerous complications of endocarditis and pericarditis to a great extent prevented. In the early stages of *acute dysentery*, opium given in full and frequently repeated doses will be found in general to check the disease; the same may be also stated of *diarrhœa*, and *common cholera*. To allay the pain of *gout* and *chronic rheumatism*, it is given in full doses with much advantage. In *delirium tremens*, opium is the remedy on which most reliance is to be placed; to prove beneficial, it should be employed in very large doses frequently repeated, thus two or three grains of solid opium must be administered every third or fourth hour. The addition of tartar-emetic to the opium as proposed by Professor Law of this city, will generally be found productive of benefit in cases of *delirium tremens* where opium alone fails to do good. It is more beneficial in *hydrophobia* and in some cases of *tetanus* than any other agent which has yet been employed; in these diseases there is a remarkable

insensibility to the action of the drug, so that it must be given in enormous doses to procure any good result. In *spasmodic* and *convulsive* diseases, opium is also a highly important remedy; as in spasm of the ureter or gall duct from the passage of calculi, in spasmodic stricture, in colic, &c. In all the varieties of neuralgia or other painful affections; in the nervous irritability which follows large losses of blood; in senile gangrene; in cancer; in painful ulcerations; in poisoning with acrid or corrosive substances, &c., opium is very generally employed as a palliative and anodyne. It has also been found a most useful adjunct to animal diet in the treatment of *diabetes*. And lastly in *venereal diseases* it is combined with mercurials to prevent them from running off by the bowels. *Externally*, opium is used in the form of infusion, liniment, or plaster; the uses of the two latter will be described amongst the pharmaceutical preparations of the drug. The infusion is applied to recent burns, or inflammations of the skin from other causes; a solution of gr. xij. each of powdered opium and of acetate of lead, infused separately in f̄iv. of tepid water, mixed and filtered, forms an excellent lotion in these cases. In *chronic ophthalmia*, or where the inflammation is of a subacute character from the commencement, the wine of opium dropped into the eye is found an excellent remedy. Suppositories of opium are introduced into the rectum in tenesmus and in painful or spasmodic affections of the neighbouring viscera.

DOSE AND MODE OF ADMINISTRATION.—In powder gr. ss. to gr. iij. or gr. iv. usually given in the form of pill, which may be made with simple mucilage, or, if they are to be kept for any time, conserve of roses—*Extractum Opī aquosum*, D. *Extractum Opī purificatum*, L. *Extractum Opī*, E. ("Take of opium, one pound; water, six pints: cut the opium into thin slices, macerate it for twenty-four hours in a quart of the water, and decant; macerate the residuum for twelve hours with a second quart of the water, decant, and repeat this process with the rest of the water, subjecting the soluble residuum to strong expression. Filter the successive infusions and expressed liquor, and evaporate them in a water bath to a proper consistence," D.—"Opium, sliced, 3xx.; boiling distilled water, cong. j.; add a little water to the opium, and macerate for 12 hours, that it may soften; then the remaining water being poured in gradually, rub them until they are very well mixed, and set by that the dregs may subside; afterwards strain the liquor, and evaporate to a proper consistence," L.—"Opium, lbj.; water, Ov.; cut the opium into small fragments, macerate it for 24 hours in a pint of water, break down the fragments with the hand, express the liquid with pretty strong pressure; break down the residuum again in another pint of water, let it macerate for 24 hours, and express the liquid; repeat the maceration and expression in the same way till the water is all used. Filter the successive infusions as they are made, passing them through the same filter; unite and evaporate them in the vapour-bath to the proper consistence," E.). A very bad preparation, and one which should be expunged from the phar-

macopœias; during the prolonged evaporation, the morphia forms a very insoluble compound with the resinoid matter of the opium, which must of course tend to lessen the activity of the drug. It is administered in the same doses as the powder.—*Pilulæ Opīi sive Thebaicæ*, E. (Opium, 1 part; sulphate of potash, 3 parts; conserve of red roses, 1 part; beat them into a proper mass, and divide into five grain pills). Each pill contains gr. j. of opium. Dose, one to three pills. The sulphate of potash is merely used as a mechanical agent, to divide the opium.—*Pilulæ Saponis compositæ*, D. L. (Opium (hard, L.) in fine powder, 3ss.; Castile (hard, L.) soap, 3ij.; “distilled water, f3ss., or as much as is sufficient; reduce the soap to a fine powder, add the opium and water, and beat the mixture into a mass of a uniform consistence,” D.; “beat them together until they are incorporated,” L.). Five grains contain one grain opium. Dose, gr. iij. to gr. x.—*Pilulæ Styracis*, E. *Pilulæ Styracis compositæ*, L. (Storax, (purified, L. the extract, E.), 3iij. (2 parts, E.); opium (hard, in powder, L.); saffron, of each, 3j. (1 part, E.); beat them into a uniform mass; “and divide into four grain pills,” E.). Every five (four, E.) grains contain one grain of opium. The storax and saffron completely conceal the odour and taste of the opium, and the name enables us to prescribe the drug without the knowledge of our patients.—*Confectio Opīi*, L. *Electuarium Opīi*, E. (“Hard opium, powdered, 3vj.; long pepper, 3j.; ginger, 3ij.; caraway seeds, 3iij.; tragacanth, powdered, 3ij.; syrup, f3xvj. Rub the dry ingredients together to a very fine powder, and keep it in a close vessel; and whenever the confection is to be used, add the syrup made hot, and mix,” L.—“Aromatic powder, 3vj.; seneka, in fine powder, 3iij.; opium, diffused in a little sherry, 3ss.; syrup of ginger, 1bj.; mix them together, and beat them into an electuary,” E.). About 30 grains, L. (43 grains, E.) contain gr. j. of opium. It is an aromatic and anodyne compound, chiefly used as an addition to chalk mixture in diarrhœa. Dose, gr. x. to 3j.—*Trochisci Opīi*, E. (Opium, 3ij.; tincture of tolu, 3ss.; syrup, f3viij.; powder of gum arabic; and extract of liquorice, softened with boiling water, of each, 3v.; reduce the opium to a fluid extract by the formula for *Extractum Opīi*, mix it intimately with the liquorice previously reduced to the consistence of treacle; add the tincture, sprinkle the gum and sugar into the mixture, and beat it into a proper mass, which is to be divided into lozenges of ten grains). Seven lozenges contain about gr. j. of opium; they are principally employed to allay troublesome cough.—*Tinctura Opīi*, D. L. E. (“Opium (hard, L.), powdered (coarsely, D.), 3iij; proof spirit, Oj.; macerate for 14 days (strain, express, D.) and filter,” D. L.—“Opium sliced, 3iij; rectified spirit, Oj. f3vij.; water, f3xiiiiss.; digest the opium in the water at a temperature near 212° for two hours, break down the opium with the hand, strain and express the infusion, macerate the residuum in the spirit for about 20 hours, and then strain and express very strongly, mix the watery and spirituous infusions, and filter. This tincture is not so easily obtained by percolation, but when the opium is of fine quality, it

may be prepared thus: slice the opium finely, mix the spirit and water, let the opium macerate in f̄xiv. of the mixture for 12 hours and then break it down thoroughly with the hand, pour the whole fluid and pulpy mass into a percolator, and let the fluid part pass through, add the rest of the spirit without packing the opium in the cylinder, and continue the process till Oij. are obtained," E.). The tincture of opium, *laudanum*, of the three pharmacopœias is about the same strength; according to Christison, min. xiiiss., or about 25 drops, contain the active part of one grain of opium. It is the most generally employed of the preparations of opium, the spirituous menstruum dissolving all the active principles of the drug, and enabling us to apportion our doses with great accuracy. Dose, min. x. to min. xxx.—*Tinctura Opii Camphorata*, D. E. *Tinctura Camphoræ composita*, L. *Paregoric elixir*. ("Opium (hard, L.) in coarse powder; benzoïc acid, of each, 3iss. (gr. lxxij. L.); camphor, 3j. (ʒiiss. L.); oil of anise, f̄3j.; proof spirit, Oij.; macerate for 14 days (strain, express, D.) and filter," D. L.—"Opium sliced; and benzoïc acid, of each, ʒiv.; camphor, ʒiiss.; anise-oil, f̄3j.; proof spirit, Oij.; digest for seven days and filter," E.). The name adopted by the London College for this preparation is the most convenient, as it enables us to prescribe opium without the knowledge of our patient; it also serves to distinguish it better from the simple tincture, and thus prevent errors in dispensing. According to Christison, the active matter of one grain of opium is contained in 267 minims or about 500 drops of the preparation of the London Pharmacopœia (the Dublin is a little stronger), and in 240 minims or about 450 drops of that of Edinburgh. It is very much employed as an anodyne in pectoral affections unaccompanied by inflammation. Dose, f̄3j. to f̄3ij.—*Acetum Opii*, D. E. ("Take of opium, in coarse powder, one ounce and a half; dilute acetic acid, one pint: macerate for seven days in a close vessel, with occasional agitation; then strain with expression, and filter," D.—"Opium, 3iv.; distilled vinegar, f̄3xvj.; triturate the opium cut into small fragments, into a pulp with a little of the vinegar, add the rest of the vinegar, macerate in a closed vessel for 7 days, and agitate occasionally, then strain, express strongly, and filter the liquors," E.). This preparation of opium is preferred by many to laudanum, as being less apt to occasion the disagreeable subsequent effects of the drug. The preparation of the Dublin Pharmacopœia is the same strength as laudanum, of that of Edinburgh about twenty drops are equivalent to thirty of the tincture of opium. Dose, D. min. x. to min. xxx., E. min. viij. to min. xxv.—*Tinctura Opii Ammoniata*, E. (Benzoïc acid; and saffron, chopped, of each, 3ij.; opium, sliced, 3ij.; anise-oil, 3ss.; spirit of ammonia, Oj.; digest 7 days and filter). This preparation is called in Scotland, *Scotch Paregoric*; it is used as an anodyne and antispasmodic. The active matter of one grain of opium is contained in 80 minims or about 150 drops, (Christison). Dose, f̄3ss. to f̄3ij.—*Vinum Opii*, D. L. E. ("Take of opium, in coarse powder, three ounces; sherry wine, two pints: macerate for 14 days, with occasional agitation, then strain with expression, and filter,"

D.—“Opium (purified extract of opium, L.), ʒiiss. (ʒiij. E.); cinnamon, bruised (in moderately fine powder, E.); and cloves bruised, of each, ʒiiss.; sherry wine, Oij.; macerate (digest, E.), for 14 (7, E.) days and filter,” L. E.). This preparation is more agreeable both in smell and taste than laudanum; it is, however, seldom employed internally, being chiefly used as an application to the eye in chronic ophthalmia. The active matter of one grain of opium is contained in about min. xvij. of the Dublin and Edinburgh wine; and in min. x. of the London. Dose, for internal use, min. x. to fʒss.—*Enema Opii*, L. E. (“Decoction of starch, fʒiv.; tincture of opium, min. xxx.; mix,” L.—“Starch, ʒss.; tincture of opium, fʒss. to fʒj.; water, fʒij.; boil the starch in the water, and when it is cool enough for use add the tincture of opium,” E.). Used as an anodyne in irritable states of the bowels. On the Continent it is generally stated that opium acts much more energetically when administered in the form of enema than when given by the mouth; but the contrary opinion is held by British practitioners, who generally employ three or four times the quantity when administered by the rectum.—*Linimentum Opii*, D. L. E. (“Soap liniment, fʒj. (fʒvj. L.); tincture of opium, fʒj. (fʒij. L.); mix with agitation,” D. L.—“Castile soap, ʒvj.; opium, ʒiss.; camphor, ʒiij.; oil of rosemary, fʒvj.; rectified spirit, Oij.; macerate the soap and opium in the spirit for three days, filter, add the oil and camphor, and agitate briskly,” E.); *Anodyne liniment*, used as an embrocation in rheumatic pains, neuralgia, &c.—*Emplastrum Opii*, D. L. E. (“Take of opium, in very fine powder, one ounce; resin plaster, nine ounces: melt the plaster by means of a steam or water bath, then add the opium by degrees, and mix thoroughly,” D.—“Opium (hard, L.), in powder, ʒss.; burgundy pitch (resin of the spruce fir, L.), ʒiij.; litharge (lead, L.) plaster, lbj.; (water, fʒviij. L.); “melt the plaster, add the pitch and opium by degrees and mix them thoroughly,” E. “Add the resin, opium and water to the melted plaster, and with a slow fire, boil down until all unite into a proper consistency,” L.). Used as an anodyne application in local pains.—*Black drop*, (Opium sliced, lbss.; expressed juice of the wild crab, Oij.; nutmegs, bruised, ʒiss.; saffron, ʒss.; boil to a proper consistence, then add, of pure sugar, ʒiv.; yeast, two spoonfuls; set the whole in a warm place near the fire for six or eight weeks, then place it in the open air until it becomes a syrup; and lastly, decant, filter, and bottle it, adding a little sugar to each bottle). This preparation resembles the officinal *Acetum Opii*; it is highly prized by many practitioners, and is said not to produce the disagreeable subsequent effects of most of the other preparations of the drug. It is more than twice the strength of laudanum, but of late years it has been very irregularly prepared, is found to vary much in its strength, and is consequently uncertain in its operation.—*Liquor Opii Sedativus*, COOLEY. (Dry opium, in powder, 1 part; clear washed sand, 2 parts; mix and moisten with water; put the mass into a percolator and pass distilled water, heated to 70° F. through the ingredients till it passes both tasteless and colourless. Evaporate the liquor over

the water-bath to the consistence of a hard pill extract. Take of this extract, ʒiij.; distilled water, fʒxxx.; boil for two minutes, let it cool and filter; then add of rectified spirit, fʒvj., and distilled water, a sufficiency to make up Oij.). It is about the same strength as laudanum, than which it is said to be less stimulating.

INCOMPATIBLES.—The alkalies, and lime water, unless they are added in excess; the carbonates of the alkalies; acetate and diacetate of lead; sulphates of iron, copper, and zinc; arsenite of potash; corrosive sublimate; and all astringent vegetable preparations.

In cases of poisoning with opium, we should immediately have recourse to the use of the stomach pump and stimulating emetics; to external stimulants, such as cold affusion, loud talking, compelled exertion, as forcing the patient to walk between two assistants, the application of ammonia or strong acetic acid to the nostrils, &c; to internal stimulants, the best of which are brandy, ammonia and its carbonate, strong coffee, camphor and musk; and if all other remedies fail, artificial respiration and galvanic shocks should be had recourse to, the assiduous application of which has in some almost hopeless cases restored life; in one instance on record, artificial respiration was kept up for nearly three hours.

PAPAYER, L. E. PAPAYER SOMNIFERUM, CAPSULÆ, D. *Poppy-heads.* The dried (ripe, L. not quite ripe, E.) capsules of *Papaver somniferum*. This plant has been described in the last article; the heads are most active when gathered before they are ripe, as directed by the Edinburgh College; they are dried in the sun.

PHYSICAL PROPERTIES.—They are globular, about the size of an apple, crowned with the persistent, many-rayed stigma; their structure is thin and fragile; they have a feeble narcotic odour, and a weak somewhat bitter taste. They contain many bland seeds, which yield by expression a yellowish fixed oil.

CHEMICAL PROPERTIES.—Poppy-heads contain a very minute proportion of the different substances found in opium, with a large quantity of woody fibre. They yield their virtues to boiling water.

THERAPEUTICAL EFFECTS.—Any medicinal virtues which poppy-heads possess depend on the presence of a small quantity of opium, consequently they are apt to vary much in strength. They are chiefly used in the form of decoction as a fomentation to inflamed or painful parts. The following officinal preparations are sometimes used internally as substitutes for opium.—*Extractum Papaveris*, L. E. (Poppy-heads without seeds, (bruised, L.), ʒxv.; boiling water, (distilled, L.), cong. j.; macerate for 24 hours, then boil down to 4 pints; strain the liquor (while hot, L.), and evaporate (in the vapour bath, E.), to the due consistence). Its effects are somewhat similar to those of opium; it is but rarely used. Dose, gr. ij. to gr. xx.—*Syrupus Papaveris*, L. E. (Poppy-heads (without the seeds, E.), lbij. (lbiss. E.); boiling water, cong. v. (Oxv. E.). “Boil

down the capsules in the water to cong. ij., and press strongly; boil down the strained liquor again to Oiv., and strain while hot, set it by for 12 hours that the dregs may subside, then boil down the clear liquor to Oij.; add lbv. of sugar and dissolve it," L. "Slice the poppy-heads and infuse them for 12 hours in the water, boil down to Ov., strain and express strongly through calico; boil again to Oiss., then add lbij. of sugar, and dissolve it with the aid of heat," E.). Syrup of poppies is usually employed as a narcotic in infantile diseases; it should be administered to infants and children with great caution, as Dr. Montgomery states that in more than one instance a teaspoonful has proved fatal to a healthy infant; this care is particularly requisite, as a preparation made by adding laudanum to simple syrup is frequently substituted for the true syrup. Dose, for infants and children, f3ss. to f3ij.; for adults, f3ss. to f3j.—*Decoctum Papaveris*, D. L. E. (Poppy capsules sliced (or bruised, D.), ʒiv.; water, Qij. (Oiv. L.); boil for a quarter of an hour (for ten minutes in a covered vessel, D.); and strain). For external use only.

RHÆAS, L. RHÆADOS PETALA, E. PAPAVER RHÆAS, PETALA D. *The petals of Papaver rhæas, the Red or Corn-poppy.* Indigenous; belonging to the Natural family *Papaveraceæ*, and to the Linnæan class and order *Polyandria Monogynia*.

BOTANICAL CHARACTERS.—A slender annual, 2-3 feet high; Stem, bristly, many flowered, its bristles and those of the flower stalks spreading; Leaves, pinnatifid; Flowers, with broad, deep scarlet petals; Capsules glabrous, nearly globose.

PROPERTIES.—The petals should be collected immediately after their expansion as they drop off easily; they should be dried quickly, so as to preserve their colour. In the recent state, red poppy petals are of a rich scarlet colour, which becomes darker by drying; they have a feeble odour of opium, and a slightly bitter taste. They consist of vegetable albumen, red colouring matter, astringent matter, soft resin, wax, gum, and some salts, (Beetz and Ludurg). It is probable that they also contain a trace of morphia. They yield their colouring matter and other principles to boiling water.

THERAPEUTICAL EFFECTS.—The petals of the red poppy probably possess some feeble narcotic properties, but they are used in medicine only in the form of syrup, as colouring ingredients, in consequence of their fine rich colour.—*Syrupus Rhæados*, L. E. (Red poppy (petals), lbj.; boiling water, Oj.; pure sugar, lbiiiss.; add the petals gradually to the water heated in a water-bath, stirring occasionally; then the vessel being removed from the bath, macerate for 12 hours, then (strain, E.) press out the liquor, and (when the dregs have subsided, L.), add the sugar and dissolve it). This syrup does not keep well.

STRAMONIUM, D. E. STRAMONII FOLIA ET SEMINA, L. *Stramo-*

nium. *Thorn-apple*. *The seeds*, D.—*The herb*, E.—*The leaves and seeds*, L.—of *Datura stramonium*. Indigenous; belonging to the Natural family *Solanaceæ*, and to the Linnæan class and order *Pentadria Monogynia*.

BOTANICAL CHARACTERS.—A herbaceous annual; Stem, much branched, forked, spreading, leafy; Leaves, ovate, angulato-sinuate, glabrous; Flowers, axillary, large, erect, white; Fruit, an ovate capsule, erect, clothed with numerous nearly equal spines, 4 celled at the base, 2 celled at the summit, many seeded.

PREPARATION.—The whole herb should be collected when the plant is in flower, and carefully dried as quickly as possible with a gentle heat. The leaves should be removed from the stem and branches which are to be rejected. The seeds when fully ripe are black, and should be then gathered.

PHYSICAL PROPERTIES.—As usually met with, the dried herb is chopped into small pieces; it is of a greenish-white colour, and has a feeble narcotic odour (which in the fresh state is strong and heavy), and a bitter nauseous taste. The seeds are small, kidney-shaped and rough; when bruised they have the same odour as the herb; their taste is nauseous and bitter. The herb has been unaccountably omitted from the last edition of the Dublin Pharmacopœia.

CHEMICAL PROPERTIES.—The seeds contain fixed oil, wax, resin, extractive, gummy matter, malic acid, some salts, and a peculiar alkaloid, which has been named *Daturia*. Geiger and Hesse first obtained it in a pure state; it is in colourless prismatic crystals, slightly volatile, soluble in 280 parts of cold, and in 72 parts of boiling water, also soluble in alcohol, but slightly so in ether; it forms crystalline salts with acids. *Daturia* has not been yet employed in medicine, but it is on it that the medicinal properties of stramonium depend; it exists also in the leaves. Both herb and seeds yield their virtues to water and to alcohol; but their activity is much impaired by long boiling, as in preparing the watery extract.

THERAPEUTICAL EFFECTS.—Stramonium leaves and seeds act as powerful narcotics, in large doses proving fatal with all the symptoms of narcotic poisoning. In medicinal doses, as might be expected from the supposed identity of their active principles, they produce effects nearly similar to those of belladonna and henbane, and have been consequently used with the same intention in the treatment of disease. In neuralgic affections as *tic douloureux* and *sciatica*, in chronic rheumatism, and in all forms of chronic disease attended with acute pain, administered in small doses frequently repeated until its narcotic influence is manifested, stramonium is a remedy of great power, and deserves to be more generally employed than it is. The inhalation of the vapour of the cut herb when burned, is frequently found of much service in the treatment of spasmodic asthma; it is used with a common pipe in the same way as tobacco, or in the form of cigar prepared by rolling the leaf. The smoking of stramonium, however, should be employed with great caution, and used only in very small quantities at a time, as in many instances it has produced dangerous symptoms; and it should never be prescribed for very old persons, or in cases where there is a tendency to apoplexy or to paralysis.

DOSE AND MODE OF ADMINISTRATION.—Of the powder of the herb or leaves, gr. j. to gr. iv.; of the seeds, gr. $\frac{1}{4}$ to gr. j., gradually increased until some obvious effect is produced. For smoking, gr. x. to gr. xx. of the chopped herb may be used, but the patient should be directed to allow an interval of at least three minutes to intervene between each inhalation of the smoke, whether a common pipe or a stramonium cigar be employed; and the effects caused by it must be carefully watched.—*Extractum Stramonii*, L. E. (“Stramonium seeds, $\bar{3}xv.$; boiling distilled water, cong. j.; macerate for 4 hours in a vessel lightly covered near the fire, then take out the seeds, bruise them in a stone mortar, and when bruised return them to the liquor; then boil down to Oiv.; strain the liquor while hot, and evaporate to a proper consistence,” L.—“Take of stramonium seeds any convenient quantity, grind them well in a coffee mill, rub the powder into a thick mass with proof spirit, put the pulp into a percolator and transmit proof spirit till it passes colourless; distill off the spirit and evaporate what remains in the vapour bath to a proper consistence,” E.). This extract is best prepared according to the directions of the Edinburgh Pharmacopœia, being more certain as well as more active. Dose, gr. $\frac{1}{4}$.; gradually increased.—*Tinctura Stramonii*, D. (Stramonium seeds, bruised, $\bar{3}v.$; proof spirit, Oij.; macerate for 14 days, strain, express, and filter). This tincture may be very conveniently prepared by thoroughly moistening the stramonium seeds, in powder, with diluted alcohol, allowing it to stand for 24 hours, then transferring it to an apparatus for displacement, and gradually pouring upon it diluted alcohol until two pints of filtered liquid are obtained. An excellent preparation. Dose, min. x. to min. xxx.

INCOMPATIBLES.—The mineral acids; caustic alkalies; and the salts of iron, lead, mercury, and silver.

In poisoning with stramonium, the same treatment should be employed as in poisoning with belladonna.

TOXICODENDRON, L. *Sumach or Poison-oak leaves*; *The leaves of Rhus toxicodendron*. A native of North America; belonging to the Natural family *Anacardiaceæ*, and to the Linnæan class and order *Pentandria Trigynia*.

BOTANICAL CHARACTERS.—A small shrub; Stems, numerous, branching; Leaves, pinnate, trifoliate; Flowers, greenish-white.

PHYSICAL PROPERTIES.—The leaves and branches in the recent state abound in an acrid milky juice which becomes black on exposure to the air; so acrid is this juice that even the emanations from the shrub will in some persons produce heat, redness, and sometimes erysipelatous inflammation, if they are exposed to its influence. In the dry state the leaves have no odour; they have a weak somewhat acrid taste.

CHEMICAL PROPERTIES.—No chemical analysis has been made of

this plant, the milky juice probably contains a volatile narcotico-acrid principle. In the dry state, the usual tests indicate the presence of tannin, gallic acid, and resinous extractive.

THERAPEUTICAL EFFECTS.—In large doses toxicodendron acts as a narcotico-acrid poison. It has not been much employed in medicine, as the leaves are nearly inert in the dry state owing to the volatility of their active principle. They were at one time much vaunted as a remedy for paralysis, particularly paraplegia, in cases where the disease was supposed to depend on a torpid condition of the nerves.

DOSE AND MODE OF ADMINISTRATION.—Of the powdered leaves, gr. j. to gr. v., three or four times a day.—*Tinctura Toxicodendri*, (Toxicodendron leaves, ʒj.; rectified spirit, fʒxij.; distilled water, fʒiv.; mix, digest for six days and filter). Dose, fʒss. to fʒj. three times daily.

CHAPTER XVI.

REFRIGERANTS.

(Temperants).

REFRIGERANTS are medicines calculated to diminish the heat of the body when morbidly increased, and to produce a sensation of coolness. Actual experiment has proved that such substances when taken into the stomach, although they cause a sensation of cold over the whole body, do not really diminish the temperature; consequently it has hitherto been found impossible to explain satisfactorily the phenomena which follow their internal use. Applied externally in the form of cooling, or evaporating lotions to inflamed parts, their mode of operation is readily understood, the temperature of the part to which they are applied being actually lowered. The principal use of refrigerants in the practice of medicine is in the treatment of febrile and inflammatory affections, in which the benefit they produce appears to depend on the fact, that their direct action on the stomach occasions sympathetically a transient reduction in the force of the circulation. During their administration, irritability is also allayed, and the morbid sensations of heat, thirst, and nausea are diminished.

ACETOSELLA, L. *Woodsorrell*; *Herb of Oxalis acetosella*. An indigenous plant; belonging to the Natural family *Oxalidaceæ*, and to the Linnæan class and order *Decandria Pentagynia*.

BOTANICAL CHARACTERS.—A small herbaceous plant; Leaves, radical, ternate, on long, slender, reddish leafstalks; Leaflets, inversely heart-shaped, hairy; Scape, single flowered; Flowers, drooping, white with purplish veins.

PROPERTIES.—*Woodsorrell* is odourless, but has an agreeable acid taste. Its only important constituent is binoxalate of potash, of which it contains from 1.06 to 1.23 per cent.; it yields its properties to boiling water.

THERAPEUTICAL EFFECTS.—This herb, infused in boiling water, forms an agreeable refrigerant drink in febrile disorders; in the present day it is only used as a domestic remedy, and might well be spared from the *Materia Medica*.

ACETUM. *Vinegar* (described in the division *Astringents*), is a

useful refrigerant in febrile or inflammatory affections. It is not much employed as such internally, nevertheless f3ss. to f3j. diluted with f3xx. of water forms a cooling drink, and may be taken *ad libitum* in cases where its astringent property is not objectionable. As an external refrigerant, its action is attended with much benefit in the treatment of most febrile and inflammatory diseases; it should be applied by means of a sponge to the surface of the body; to form a solution for this purpose, f3j. is mixed with f3iij. of cold or tepid water according to circumstances. For internal use the simple oxymel of the Dublin and London Pharmacopœias is well adapted, or the following preparation may be used:—*Syrupus Aceti*, E. (Vinegar, French in preference, f3xj.; pure sugar, 3xiv. boil them together). Dose, f3ij. to f3j. as an adjunct to other medicines.

ACIDUM CITRICUM, D. L. E.—*Citric acid*.

PREPARATION.—An article of the *Materia Medica* in the last edition of the Dublin Pharmacopœia. *London*.—*Edinburgh*.—Lemon juice, Oiv.; prepared chalk 3ivss. (or a sufficiency, E.); dilute sulphuric acid, f3xxvijss. (f3xxxvj., or in the same proportion to the chalk required, E.); (distilled water, Oij., L.); “Add the chalk gradually to the lemon-juice made hot, and as soon as the citrate of lime has subsided, pour off the supernatant liquor; wash the citrate frequently with warm water; then pour upon it the diluted sulphuric acid and the distilled water, and boil for a quarter of an hour. Press the liquor strongly through linen and strain it; evaporate the strained liquor with a gentle heat, and set it by that crystals may be formed; dissolve the crystals, that they may be pure, again and a third time in water, strain each time, boil down, and set aside,” L. “Boil the lemon-juice, let it rest, pour off the clear liquor, boil this again, and add the chalk to it while hot by degrees, till there is no more effervescence, and the liquid ceases to taste acid. Collect the precipitate and wash it with hot water till the water passes colourless, squeeze the residuum in a powerful press; mix it uniformly with Oij. of distilled water, and then add the sulphuric acid by degrees and with constant stirring. Try whether a small portion of the liquid, when filtered, gives with solution of nitrate of baryta, a precipitate almost entirely soluble in nitric acid; and if the precipitate is not nearly all soluble, add a little citrate of lime to the whole liquor till it stand this test. Separate now the clear liquor by subsidence or filtration, washing the insoluble matter with cold water, and adding the washings to the liquor; concentrate with a gentle heat till crystals form on the surface, set the liquor aside to cool and crystallize, and purify the crystals by repeated solution and crystallization till they are colourless,” E.

PHYSICAL PROPERTIES.—Citric acid crystallizes in transparent, colourless, regular rhomboidal prisms, terminated by four trapezoidal faces. They are inodorous, but have an agreeable, purely acid taste. Specific gravity, 1.617

CHEMICAL PROPERTIES.—Crystalline commercial citric acid consists of, $C^{12} H^5 O^{11}$, 3 HO, + HO, but on cooling a saturated solution at 212° , it crystallizes with two equivalents less of water. The crystals are permanent in the air; heated at 212° they part with their water of crystallization, and at a higher temperature are decomposed; 100 parts of citric acid are soluble in 75 parts of cold, or 50 of boiling water; the solution undergoes decomposition when kept even in close vessels, and becomes covered with mould. When

pure, the crystals dissolve completely in alcohol. Citric acid is readily distinguished by the following characteristic: when a few drops of a solution of the acid are added to lime water, a clear liquid results which on being heated becomes turbid, from the deposition of a white precipitate.

Adulterations.—Citric acid is liable to be adulterated with sulphuric or tartaric acid, sulphates, tartrates, and lime. The presence of sulphuric acid or the sulphates is detected by adding acetate of lead to a solution of the acid, if the impurity be present, the precipitate occasioned is not dissolved by nitric acid. The presence of tartaric acid or the tartrates is shown by the crystalline precipitate being formed, on the addition of carbonate of potash dissolved in water, to a solution of the acid in excess. Lime or any other fixed impurity is detected by incinerating the acid with the aid of a little red oxide of mercury; if it be pure, no ash or a mere trace will be left.

THERAPEUTICAL EFFECTS.—Citric acid produces the refrigerant effects of lemon-juice, as a substitute for which it may be employed to form cooling drinks in febrile affections, but fresh lemon-juice should be preferred whenever it can be obtained.

DOSE AND MODE OF ADMINISTRATION.—ʒj. to ʒj. To prepare a solution of the same strength as lemon-juice, ʒviiiiss. of the acid are to be dissolved in fʒxvj. of water.—*Syrupus Acidi Citrici*, D. (Take of citric acid, in powder,; distilled water, of each, two and a half ounces; tincture of lemon peel, five fluid drachms; simple syrup, three pints. Dissolve the acid in the water with the aid of heat; then add the solution and tincture of lemon peel to the syrup, and mix with agitation). Intended as a substitute for the syrup of lemons of former pharmacopœias; it will keep better, but the presence of spirit renders it unsuited for many purposes, and it also has not the agreeable fresh flavour of the syrup prepared from lemon juice. Dose, fʒij. to fʒj.; one ounce contains nearly a scruple of citric acid.—Citric acid is also employed to form effervescing draughts with the alkaline carbonates; gr. xx. of the acid are saturated by about gr. xxix. of crystalline bicarbonate of potash, or gr. xlj. of crystalline carbonate of soda, or gr. xxiv. of bicarbonate of soda, or gr. xvij. of hydrated sesquicarbonate of ammonia.—*Pulveres Effervescentes Citrati*, D. (Take of crystals of citric acid, nine drachms; bicarbonate of soda, eleven drachms; or, bicarbonate of potash, thirteen drachms. Reduce the acid and alkaline bicarbonates, separately, to a fine powder, and divide each into eighteen parts. The acid and alkaline powders should be kept in papers of different colours). These powders should only be prepared when required for use, and not kept in boxes for months as they usually are.

INCOMPATIBLES.—The alkalies; carbonates; acetates; the alkaline and earthy sulphurets; and tartrate of potash.

ACIDUM OXALICUM. *Oxalic acid.*

PREPARATION.—It is prepared on the large scale as an article of commerce for use in the arts, by the action of nitric acid on treacle or potato starch. For use in medicine it may be further purified by dissolving it in water and re-crystallizing.

PHYSICAL PROPERTIES.—Oxalic acid crystallizes in four-sided oblique prisms with dihedral summits; it is odourless but has a very acid taste. Specific gravity, 1.50.

CHEMICAL PROPERTIES.—It is composed of 2 equivalents of carbon and 3 of oxygen, combined in the crystalline state with 3 of water ($C^2 O^3, HO + 2 HO$). The crystals effloresce in the air and lose two equivalents of their water of crystallization; exposed to a temperature of $354^{\circ} F$. they melt, and are partly decomposed, one portion subliming and the other being converted into carbonic oxide, carbonic acid, and formic acid. Oxalic acid is very soluble in water and in alcohol; it also dissolves unchanged in dilute nitric and sulphuric acids. The watery solution reddens litmus paper, and decomposes the carbonates with effervescence. The best characteristic of oxalic acid is the action of nitrate of silver on its solution: it produces a white precipitate, soluble in nitric acid, which, when heated over the flame of a spirit lamp, detonates feebly.

THERAPEUTICAL EFFECTS.—Oxalic acid is a powerful poison, when taken in large doses or in a concentrated solution acting as a corrosive, while a weak solution produces death with marked symptoms of depression of the circulation and of the nervous system.* It is but rarely used as a medicine in this country, but on the continent it is employed as a refrigerant in the form of lemonade. From the results of the experience of M. Nardo, who has used this acid very extensively, it is to be preferred to the other vegetable acids as a refrigerant and antiphlogistic in all acute inflammations of mucous membranes, more especially when the stomach is the seat of the disease.

DOSE AND MODE OF ADMINISTRATION.—From gr. j. to gr. ij. dissolved in f3j. or f3ij. of water. Gr. x. give an agreeable acidity to Oj. of water, and half of this quantity may be taken in the 24 hours.

The solution may be sweetened with sugar if preferred. In poisoning with this acid, chalk, whiting, or magnesia suspended in water should be *at once* administered, and vomiting *afterwards* excited by emetics or by the use of the stomach pump.

ACIDUM TARTARICUM, D. L. E.—*Tartaric acid.*

* Poisoning with oxalic acid most frequently occurs, in consequence of its being mistaken for sulphate of magnesia, to which it bears much resemblance. It may be readily distinguished from the latter by pouring a few drops of common writing ink on the crystals, which are changed to a reddish-brown colour by oxalic acid, but no effect is produced on them by sulphate of magnesia. The solution, also, of Epsom salts tastes nauseous and bitter while that of oxalic acid is purely and intensely acid, but not at all bitter.

PREPARATION.—An article of the *Materia Medica* in the last edition of the *Dublin Pharmacopœia*. *London. Edinburgh.*—"Bitartrate of potash, ℥iv.; boiling distilled water, cong. iiss.; prepared chalk, ℥xxv. ʒvj.; dilute sulphuric acid, Ovj. f℥xvij. (Ox. f℥vij., E.); muriatic acid, f℥xxviiss. or a sufficiency; boil the bitartrate with cong. ij. of the water, and add gradually half the chalk; when the effervescence is over add the remainder of the chalk, first dissolved in muriatic acid diluted with Oiv. of water. After the tartrate of lime has subsided, pour off the liquor, and wash the tartrate frequently with distilled water, till it is tasteless; then pour on it the sulphuric acid, and boil for a quarter of an hour; evaporate (the strained liquor, L.) with a gentle heat, to obtain crystals. Purify by repeated solution, filtration and crystallization."

PHYSICAL PROPERTIES.—Tartaric acid occurs in white, semi-transparent crystals of considerable size, the primary form of which is the right rhombic prism; it is inodorous, but has a purely acid taste. Specific gravity, 1.75.

CHEMICAL PROPERTIES.—In the crystalline state it consists of $C^8 H^4 O^{10}$ with two equivalents of water. The crystals are permanent in the air; exposed to heat, they fuse in their water of crystallization, which is all driven off if the temperature be raised; and at a temperature considerably below redness, the acid is decomposed, and a series of new compounds formed. Tartaric acid is soluble in $1\frac{1}{2}$ parts of cold water, and in half its weight of boiling water; it is also soluble in alcohol. The aqueous solution becomes mouldy by keeping. The most distinguishing characteristic of this acid is the crystalline precipitate, which is produced when it is added in excess to a concentrated solution of a salt of potash.

Adulterations.—Tartaric acid is adulterated with bitartrate of potash, and with lime; the former is detected by its little solubility in cold water; the latter by an ash being left, on the acid being incinerated with the aid of red oxide of mercury.

THERAPEUTICAL EFFECTS.—To prepare refrigerant drinks in febrile and inflammatory diseases, tartaric acid is much employed as being cheaper than citric acid. Its principal use, however, is for the preparation of effervescing draughts, when added to the alkaline carbonates.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒss.; its refrigerant effects are best manifested when it is dissolved in a large quantity of cold water. For the preparation of effervescing compounds, the following are the proportions required:—gr. xx. of crystallized tartaric acid are saturated by gr. xxvij. of crystallized bicarbonate of potash, or gr. xxxviiiiss. of crystallized carbonate of soda, or gr. xxij. of sesquicarbonate of soda, or gr. xvss. of hydrated sesquicarbonate of ammonia.—*Pulveres Effervescentes Tartarizati*, D. (Take of crystals of tartaric acid, ten drachms; bicarbonate of soda, eleven drachms; or, bicarbonate of potash, thirteen drachms. Reduce the acid and alkaline bicarbonates, separately, to a fine powder, and divide each into eighteen parts. The acid and alkaline powders should be kept in papers of different colours). For preparing ordinary effervescing draughts.—*Trochisci Acidi Tartarici*, E. (Tartaric acid, ʒij.; pure sugar, ʒviij.; volatile oil of lemons,

min. x.; pulverize the sugar and acid, add the oil, mix them thoroughly, and beat them with mucilage into a proper mass for making lozenges). Commonly employed under the name of *acidulated drops* in mild sore throat, and colds.

INCOMPATIBLES.—The alkalies; salts of potash, of lime, of mercury, and of lead; all carbonates; and the vegetable astringents.

CITRUS AURANTIUM, FRUCTUS, D. AURANTIUM, L.—*The fruit of Citrus aurantium*; *The common sweet orange tree*. This tree is indigenous in many parts of Africa and Asia; and is cultivated extensively in the south of Europe, the Azores and the West India Islands. It belongs to the Natural family *Aurantiaceæ*, and to the Linnæan class and order *Polyadelphia Polyandria*.

BOTANICAL CHARACTERS.—Stems, smooth, cylindrical, from 12 to 15 feet high; Leaves, oval, pointed, entire, shining, coriaceous, on elongated winged petioles; Flowers, large, white, axillary, 2-6 on a common peduncle, fragrant; Fruit, the well known sweet orange.

The fruit of the orange is too well known to require description; the juice consists of citric and malic acids, citrate of lime, mucilage, albumen, sugar and water.

THERAPEUTICAL EFFECTS.—The juice of the sweet orange is an agreeable refrigerant, calculated to allay thirst in febrile and inflammatory affections; it is particularly beneficial in diseases attended with much thirst, and in which it is important not to introduce a large quantity of fluid into the stomach or intestines, as in strangulated hernia, &c.

LIMONES, D. L. E. LIMONUM SUCCUS, D. L. *Lemons (and Limes, E.)*. *Lemon-juice*. *The fruit of Citrus limonum*, D. L. E., and of *Citrus medica*, E. Natives of the same countries, and belonging to the same botanical classification as *Citrus aurantium*.

BOTANICAL CHARACTERS.—The lemon-tree attains a height of 10-15 feet; Leaves, oval, or oblong, usually toothed, petiolate; the petioles simply margined, not winged; Flowers, white, tinged with red; Fruit, ovoid, terminated with an elongated knob; containing an acid pulp.

PROPERTIES.—Lemons are too well known to need description; the juice consists of 1·77 per cent. of citric acid, 0·72 of gum, malic acid and bitter extractive, and 97·51 of water. Lemons decay by keeping; Christison states that they are best preserved by packing them with newly-slaked lime in bottles or earthenware jars, the mouths of which are secured with corks and wax. The juice may be kept unchanged for years, by adding to it when expressed and

strained, a tenth part of spirit of wine, filtering, and preserving in well-stopped bottles.

THERAPEUTICAL EFFECTS.—Lemon-juice forms a useful and agreeable refrigerant, allaying thirst and diminishing preternatural heat in febrile and inflammatory diseases; it is also found particularly useful in hemorrhages of an acute character. Recently it has been employed by Dr. G. O. Rees of London in the treatment of acute rheumatism, and most of those who have tried it on his authority corroborate his statements of its efficacy. Under its influence the agonizing pain is said to be very rapidly relieved, and the frequency of the pulse diminished in a marked degree. The form of rheumatism in which lemon-juice seems to produce the greatest benefit is the acute disease, when the small as well as the large joints are engaged, or that variety which is ordinarily termed rheumatic gout. No satisfactory explanation of the mode in which this remedy acts in rheumatic diseases has yet been offered.

DOSE AND MODE OF ADMINISTRATION.—Lemon-juice is usually administered in the form of *lemonade*, which is prepared by adding the juice to about ten or twelve parts of boiling water, and sweetening with sugar to the taste; in acute rheumatism Dr. Rees gives from one to four fluid ounces in the twenty-four hours; it is also much employed for the preparation of effervescing draughts with the alkaline carbonates; gr. xx. of the bicarbonate of potash require for saturation f3iiiss. of lemon-juice; gr. xx. of the sesquicarbonate of soda, f3ivss.; and gr. xx. of the sesquicarbonate of ammonia, f3vj.—*Syrupus Limonum*, L. E. (Lemon-juice, strained (freed of impurities by subsidence, and filtering, E.), Oj.; sugar, fbiiss.; dissolve the sugar in the lemon-juice with a gentle heat, then set it aside for 24 hours; remove the scum, and pour the clear liquor from the dregs). An excellent addition to refrigerant drinks; in febrile affections it may be given with barley water. This syrup must be kept in well-stopped bottles in a very cool place. Dose, f3j. to f3ij.

MORA, L. *Mulberries.* The fruit of *Morus nigra*. A native of Persia, now cultivated in this country; it belongs to the Natural family *Urticaceæ* (*Moraceæ*, Lindley), and to the Linnæan class and order *Monœcia Tetrandria*.

BOTANICAL CHARACTERS.—A small tree with rugged bark; Leaves, cordate, lobed; Flowers, greenish, in small roundish catkins; Fruit, dark purple, “consisting of the female flowers, become fleshy and grown together, inclosing a dry membranous pericarp,” (Lindley).

PROPERTIES.—The fruit, commonly called mulberries, has a faint, agreeable odour, and an acidulous, sweetish taste. It contains tartaric acid, sugar, colouring matter, and water. It yields its virtues to boiling water.

THERAPEUTICAL EFFECTS.—Mulberry juice is an agreeable refrigerant, but taken in quantity it is apt to produce diarrhœa. In the present day it is very seldom used.—The following is the only official preparation of mulberries:—*Syrupus Mori*, L. (Juice of mulberries, strained, Oj.; sugar, ℥iiss.; dissolve the sugar in the mulberry juice with a gentle heat, and proceed as for syrup of lemons). Used for the same purposes as the syrup of lemons; it has a fine purple colour. Dose, fʒj. to fʒij.

POTASSÆ CHLORAS, D. L.—*Chlorate of potash.*

PREPARATION.—An article of the *Materia Medica* in the Dublin and London Pharmacopœias; it is prepared on the large scale by transmitting chlorine gas to saturation through a strong solution of carbonate of potash.

PHYSICAL PROPERTIES.—In flat, pearly crystals, of the oblique prismatic system; inodorous, but having a cooling, unpleasant taste, like that of nitre. Specific gravity, 1·989.

CHEMICAL PROPERTIES.—It is composed of one equivalent of potassa, and one of chloric acid, ($\text{KO}, \text{Cl O}^5$). It is permanent in the air; exposed to heat, it fuses and gives out oxygen below a red heat; if the heat be increased, all the oxygen is driven off, and chloride of potassium left. It is soluble in about 17 parts of cold water, and in twice its weight of boiling water. This salt is readily known; by dropping a little sulphuric acid on the crystals they first become yellow, afterwards red, and give out the greenish-yellow gas,—peroxide of chlorine.

Adulterations.—The only impurity met with in this salt is chloride of potassium, and this arises from faulty preparation; it is readily detected by adding nitrate of silver to a solution of the salt in distilled water, if any chloride be present a white precipitate is thrown down.

THERAPEUTICAL EFFECTS.—Chlorate of potash in its action on the system, resembles nitre; by some it has been held to be diuretic, but its most manifest action is refrigerant. It was formerly employed in diseases which were supposed to depend on a deficiency of oxygen, as in phthisis, and scurvy. More recently it has been proposed as a remedy in diseases attended with a deficiency of the saline constituents of the blood, as in malignant cholera, typhoid fevers, &c. Almost the only disease, however, in which it is at present used is in *cancerum oris*, or phagedenic ulceration of the cheek in children; and in this affection it proves singularly beneficial.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xx. dissolved in water, and sweetened with syrup. The dose for children is from gr. iiss. to gr. v. according to the age, and in the disease above mentioned this quantity should be given every hour or at least every second hour.

POTASSÆ NITRAS. *Nitrate of Potash* (described in the division *Diuretics*), operates as a refrigerant, sensibly diminishing preternatural heat in febrile and inflammatory affections; during its operation the force and frequency of the pulse are diminished also, and it has consequently been named a sedative-refrigerant. Towards the close of the last century nitre was given in large doses in the treatment of acute rheumatism, and this practice has been recently revived, first in Paris, and subsequently in England. So far as my own experience would lead me to judge, it is productive of the most beneficial results in many cases, but in some it fails to afford the least relief; and in all after the second or third day it causes great nausea and loathing. The manifest effects I have seen to follow its use are a great increase in the urinary secretion, and a diminution in the force and frequency of the pulse; according to others it causes copious sweating and purging. The employment of nitre in hemorrhages, particularly hemoptysis, is attended with much benefit, which depends undoubtedly on its combined action above referred to. It proves very beneficial in the treatment of asthma, especially when dependant on disease of the heart. Nitrate of potash is contra-indicated in inflammatory affections of the stomach, the intestinal canal, the kidneys or bladder, in consequence of its irritant properties which have been alluded to in a previous article. Externally, nitre is employed as a means of producing cold during its solution in water.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to gr. xx. mixed with sugar or dissolved in water. In the treatment of acute rheumatism it must, however, be given in *very large* doses, from four to six drachms in the course of the 24 hours, rapidly increased to eight, ten, or even twelve drachms. When thus prescribed it should be given dissolved in a large quantity of fluid; ʒj. in fʒviii. of gruel, barley-water or lemonade. *Nitre whey*, prepared by boiling ʒij. of nitre in Oj. of new milk and straining, is an excellent refrigerant drink in mild febrile diseases; Dose, fʒij. to fʒiv. Where nitre is to be administered as a refrigerant dissolved in water, the effect is much increased if the solution is not made until just before it is swallowed.

ROSA CANINA, FRUCTUS PULPA, L. ROSÆ FRUCTUS, E. *The pulp of the fruit*, L.—*The hip, deprived of the carpels*, E.—*of Rosa canina*; and of several allied species, E. The dog-rose is a common indigenous shrub, belonging to the Natural family *Rosaceæ*, and to the Linnæan class and order *Icosandria Polygynia*.

BOTANICAL CHARACTERS.—Stem, with scattered, hooked prickles, which are dilated at the base; Leaves, naked or slightly hairy; Leaflets, with irregular serratures; Flowers, rose red; Fruit, scarlet.

PROPERTIES.—The pulp (*hip*) of the dog-rose consists of the fleshy calyx, inclosing numerous small carpels enveloped with hairs;

it is of a bright scarlet colour, smooth and shining. The external coat alone is used in medicine; it should be carefully freed from the carpels and hairs; it has a sweetish acidulous taste, and is composed chiefly of uncrystallizable sugar, gum, citric and malic acids.

THERAPEUTICAL EFFECTS.—The hip of the dog-rose is an agreeable refrigerant; it is only employed in medicine in the following preparation.—*Confectio Rosæ caninæ*, E. *Conserva Rosæ fructus*, L. (“Pulp of the dog-rose, ℞j.; sugar, powdered, ʒxx.; expose the pulp of the rose to a gentle heat in an earthen vessel, then add the sugar gradually, and rub together until they are thoroughly incorporated,” L.—“Take any convenient quantity of hips carefully deprived of their carpels, beat them to a fine pulp, adding gradually thrice as much sugar,” E.). Used only as a basis for forming more active remedies into pills or electuaries, and as it contains no tannin, it may be employed for this purpose with the salts of iron.

RUMEX, L. Sorrel. *The leaves of Rumex acetosa.* An indigenous plant, belonging to the Natural family *Polygonaceæ*, and to the Linnæan class and order *Hexandria Trigynia*.

BOTANICAL CHARACTERS.—1-2 feet high; Leaves, oblong, arrow-shaped; Flowers purplish, with large, orbiculari-cordate petals; Nuts, triquetrous.

PROPERTIES.—Sorrel leaves have an agreeable acidulous taste, which they owe to binoxalate of potash, they also contain tartaric acid.

THERAPEUTICAL EFFECTS.—They were at one time employed for preparing acidulous refrigerant drinks in fevers, but are now never used.

CHAPTER XVII.

SEDATIVES OR CONTRA-STIMULANTS.

(Calmatives).

SEDATIVES are medicines which directly or primarily depress the vital powers, without inducing any previous excitement; from their action being the reverse of Stimulants, they have also been very generally termed CONTRA-STIMULANTS. This class of medicinal agents has been in general confounded with *Narcotics*; and were we merely to theorize on their mode of action, it would perhaps be difficult to draw an exact line of distinction, but when we come to consider the remedial powers of the medicines classed under each head, it will, I think, be at once evident how *practically* essential it is, that we should recognize this as an especial class of remedial agents. The diseases in which sedatives are employed are those of over excitement of the nervous and vascular systems: some of the substances contained in this class, for example Hemlock, act directly on the nervous system; while others, as *Digitalis*, influence more immediately the vascular organs. It will, therefore, be necessary before prescribing for individual cases, to consider attentively the peculiar operation of the different sedatives. An important and practical rule to be borne in mind, with reference to the operation of contra-stimulants, is that the dose must in general be proportioned to the degree of excitement present; this *tolerance* of medicines is remarkably illustrated by the very large doses of *tartar emetic* which are administered not only with impunity, but with advantage, when inflammatory action runs high. To the remedies which have ordinarily been described as sedatives, the modern discoveries in medicine have made an important addition under the name of *Anæsthetics*; this appellation includes certain vapours or gases, by the inhalation of which sensation and the power of the will are temporarily suspended. The vapour of sulphuric ether was at first employed to produce this effect, but as its use has been altogether superseded by chloroform since the discovery of Professor Simpson, of Edinburgh, I will not include it in this chapter, but as in former editions, describe it amongst the general stimulants according to its effects when taken into the stomach in the fluid form.

ACIDUM HYDROCYANICUM DILUTUM, D. L. ACIDUM HYDROCYANICUM, E. *Medicinal Hydrocyanic or Prussic acid. Hydrocyanic acid diluted with about fifty (thirty, E.) parts of water.* (Syn. *Acidum prussicum*, D.).

PREPARATION.—*Dublin*.—"Take of ferrocyanide of potassium, two ounces; oil of vitriol of commerce, one fluid ounce; water, twelve ounces. Dissolve the salt in eight ounces of the water, and dilute the oil of vitriol with the remaining four ounces. When both solutions are cold, introduce them successively into a retort or matrass, containing several slips of platinum foil, and connected in the usual manner with a Liebig's condenser; and, with the aid of a gentle heat, let eight ounces be distilled over. Finally, dilute the product with eight ounces of distilled water, or so that the volume of the diluted acid shall be sixteen fluid ounces. The specific gravity of this acid is 997."

London.—"Ferrocyanide of potassium, ʒij.; sulphuric acid, ʒiiss.; distilled water, Oiss.; mix the acid with fʒiv. of the water, and to these when cooled and put into a glass retort, add the ferrocyanide of potassium first dissolved in Oss. of water; pour fʒviii. of the water into a cooled receiver, then the retort being fitted on, let fʒvj. of acid pass into this water distilled with a gentle heat in a sand bath. Lastly, add fʒvj. more of distilled water, or as much as may be sufficient, that 12·7 grains of nitrate of silver dissolved in distilled water may be accurately saturated by 100 grains of this acid. Diluted hydrocyanic acid may be also prepared, when it is more immediately wanted, from gr. xlviiiiss. of cyanide of silver, added to fʒj. of distilled water, mixed with gr. xxxixss. of hydrochloric acid. Shake all these in a well-stopped vial, and after a short interval pour off the clear liquor into another vessel. Keep this for use, the access of light being prevented." *Edinburgh*.—"Ferrocyanide of potassium, ʒiij.; sulphuric acid, fʒij.; water, fʒxvj.; dissolve the salt in fʒxj. of the water, and put the solution into a matrass with a little sand; add the acid previously diluted with fʒv. of the water and cooled; connect the matrass with a refrigeratory; distil with a gentle heat, by means of a sand-bath or naked gas-flame till fʒxiv. pass over, or till the residuum begins to froth up; dilute the product with distilled water till it measures fʒxvj."

PHYSICAL PROPERTIES.—Medicinal hydrocyanic acid is a colourless liquid with a peculiar penetrating odour, and a bitter taste, leaving a warm sensation on the tongue and palate. The odour is generally stated to resemble that of the volatile oil or distilled water of bitter almonds, but it is decidedly different and should not be confounded with it. The specific gravity varies with the quantity of real or anhydrous acid contained in the medicinal preparation.

CHEMICAL PROPERTIES.—The dilute acid is a mixture of anhydrous hydrocyanic acid and water. The Dublin preparation contains 2 per cent., that of London is of the same strength, while that of Edinburgh is stronger, containing 3·3 per cent. Anhydrous hydrocyanic acid is composed of 1 equivalent of cyanogen, and 1 of hydrogen, (H + Cy.). The quantity of pure acid contained in the medicinal preparation may be readily ascertained, "by accurately weighing a portion of it, amounting to about 100 grains, adding to this portion nitrate of silver in excess, collecting the white insoluble precipitate of cyanide of silver which falls on a weighed filter, drying and weighing together precipitate and filter; five parts of the precipitate correspond to one part of pure acid," (Graham). Hydrocyanic acid reddens litmus paper feebly and the red tint disappears by heat; it is very volatile, and soon decomposes by keep-

ing, a black precipitate being formed in it. For medicinal purposes, the dilute acid may be kept for a long time unchanged by the addition of a few drops of sulphuric acid. The best test for the presence of this acid is its action on sulphate of iron; if a few drops of a solution of caustic potash be added to a fluid suspected to contain hydrocyanic acid, and then a solution of a mixed proto- and sesqui-salt of iron, as the common sulphate or tincture of the muriate of the shops, a greenish precipitate is produced, which becomes bright Prussian blue on the addition of a little sulphuric acid. Its presence is also indicated by adding a few drops of sulphuric acid to the liquid containing it, and covering the vessel with a glass plate having its lower surface moistened with a solution of nitrate of silver; owing to the volatility of the acid the surface of the plate will be covered with the white cyanide of silver.

Adulterations.—Medicinal prussic acid, as met with in the shops, varies much in strength, is often much contaminated with impurities, and frequently is unfit for use from having been too long kept. The strength is most conveniently ascertained by Professor Graham's test given above, of course bearing in mind the difference of the preparations of the British pharmacopœias. The presence of any fixed impurity is indicated by the preparation not being entirely vaporizable by heat. The most common impurity met with is sulphuric or hydrochloric acid; the presence of either may be suspected if the medicinal preparation acts strongly on litmus paper; they may be easily detected by the test first proposed by Professor Geoghegan of this city: "Drop one or two crystals of the *hydrargyro-iodo-cyanide of potassium** into the suspected acid, should any foreign acid be present a red precipitate will immediately be formed on them." Concentrated distilled water of bitter almonds is sometimes substituted for prussic acid; the sophistication may be detected by placing a small quantity of the suspected liquid in an open phial in a sand-bath, and holding a piece of litmus paper over the mouth of the bottle, if it be bitter almond water no effect will be produced on the paper, but it will be reddened by the vapour of prussic acid. When unfit for use from being kept too long, prussic acid is generally, though not always, discoloured.

THERAPEUTICAL EFFECTS.—Hydrocyanic acid is the most powerful poison with which we are acquainted; "death has been occasioned in man by a mixture containing scarcely one grain of the anhydrous acid," (Christison). The usual symptoms produced by a poisonous dose are convulsions, difficult and spasmodic breathing, and insensibility, followed by death in a few minutes; in some instances, however, life has been prolonged for half an hour or more; but if the quantity taken be very large, death occurs so rapidly that the only symptoms that can be observed are two or three deep hurried

* "This salt may be readily prepared by adding a concentrated solution of bicyanide of mercury to a solution of iodide of potassium, when it is precipitated in the form of white or pearly crystalline plates."

inspirations, which have been in some instances, it is stated, preceded by a loud shriek, this however is very doubtful. In medicinal doses hydrocyanic acid acts as a direct sedative, producing immediately after it has been taken a sensation of quiet and calmness throughout the whole system, diminishing the force and frequency of the pulse, lowering the sensibility of the nervous system, and allaying irritation when it exists; in addition to the above, which may be said to be its more immediate effects, hydrocyanic acid promotes the digestive powers, and in many instances acts gently on the bowels. As a remedial agent this acid has been principally used to allay irritability, to diminish pain, and to lessen spasm. Thus, it has been used with much benefit in spasmodic and painful affections of the stomach and bowels, as in *gastrodynia* and *enterodynina*, in *pyrosis*, particularly when accompanied by much pain, in chronic vomiting, and in *colica pictonum*. It has also been found very serviceable in allaying irritable or spasmodic cough in various pulmonary affections, as in simple hooping cough unattended with inflammation, in pure spasmodic asthma, in the advanced stages of phthisis, and in the spasmodic cough of nervous and hysterical females. It has been successfully employed to allay vomiting and purging in severe cases of common cholera, and to check the colliquative diarrhoea and sweating of hectic. Lastly, it has been administered as a calmative and anodyne in neuralgia, tic douloureux, chronic rheumatism, cancerous affections, and nervous palpitations, but its success has been very equivocal. Externally, in the form of lotion, it will be found very serviceable in allaying the violent itching which attends many forms of skin disease. The vapour of prussic acid has been applied to the eye in amaurosis by Dr. Turnbull, but its efficacy is very doubtful; in one case which I saw with Mr. Wilde of this city, its employment for this purpose produced giddiness, temporary insensibility and other symptoms of poisoning, followed by erysipelatous inflammation of the face and forehead.

DOSE AND MODE OF ADMINISTRATION.—The medicinal acid should be at first administered in doses of one or two drops, which should be repeated every second or third hour according to circumstances, its effects being very transitory. It is best given in distilled water to which simple syrup may be added; it should be always prescribed in the form of draught, as when given in mixture, it is apt to float on the top of the liquid, and thus a single dose may produce dangerous effects. The quantity given should be increased very gradually, and its effects carefully watched. For external use, a lotion may be prepared with fʒij. of the acid, and fʒviij. of distilled water.

INCOMPATIBLES.—Nitrate of silver; red oxide of mercury; sulphate of copper; sulphate and muriate of iron if an alkali be present; all sulphurets; and strychnia.

In cases of poisoning with prussic acid, if the person be seen immediately, he should be made to inhale ammonia diluted with atmospheric air, or the solution of this gas in water should be

administered in small but frequently repeated doses; but if some time have elapsed, and insensibility be present, the most powerful external stimulants, with the cold affusion, and artificial respiration, should be employed. More recently the Messrs. Smith of Edinburgh have proposed a mixture of a proto- and a per-salt of iron combined with an alkaline carbonate, as an antidote for prussic acid; and from the experiments performed with it, its use appears to be attended with complete success. The method recommended by these gentlemen is as follows:—Dissolve gr. x. of sulphate of protoxide of iron in f3j. of water and add to it f3j. of tincture of muriate of iron; and dissolve in another vessel gr. xx. of carbonate of potash in f3j. or f3ij. of water; the latter solution is to be administered first, and immediately afterwards the solution of iron. Of all the remedies, however, which have been proposed for the treatment of poisoning with hydrocyanic acid, none have been attended with the good results which have followed from the use of the cold affusion, or preferably the cold *douche* on the head only; and in some recently recorded cases, recovery has taken place even where this remedy had not been had recourse to for some time after the symptoms of poisoning had appeared.

ACONITUM NAPELLUS, RADIX, D. ACONITUM, E. ACONITI FOLIA ET RADIX, L. *Monkshood.* The root (leaves, E.) of *Aconitum napellus*, D. E.—The root and leaves of *Aconitum paniculatum*, L. It has not yet been accurately ascertained which species of the genus *Aconitum* was employed by Störck, who was the first to use it as a medicine; the reference of the Dublin and Edinburgh Colleges is not only the more correct, but, according to the accurate and trustworthy experiments of Dr. Alexander Fleming, whose treatise on this plant is a model of the manner in which such an inquiry should be conducted, the species of aconite there indicated is the only European species possessed of any medicinal activity. It is said to grow wild in some parts of England, but it was probably introduced from the Continent of Europe, where it grows abundantly in woods. It belongs to the Natural family *Ranunculaceæ*, and to the Linnæan class and order *Polyandria Trigynia*.

BOTANICAL CHARACTERS.—Root, tapering, with one or more pyriform tubers attached; Stems, simple, 2-6 feet high; Leaves, palmate, cuneate, pinnatisect; Flowers on a cylindrical simple raceme, deeply hairy, with an irregular petaloid calyx, the upper leaflet of which is helmet shaped.

MODE OF PREPARATION.—The root should be dug up immediately after the plant flowers, and the tubers alone employed; they should be cut into thin slices, and dried slowly at a low temperature; the leaves should be gathered just before the flowers expand, and dried carefully with a stove heat.

PHYSICAL PROPERTIES.—Aconite root has a faint earthy odour, and a bitter acrid taste, leaving a benumbing impression on the lips and tongue; it is the most active part of the plant. The leaves have a very feeble narcotic odour; their taste is similar to that of the root. When carefully dried, they retain their virtues for many years, if kept in close vessels in a dry place excluded from the light.

CHEMICAL PROPERTIES.—No very accurate chemical analysis has been made of this plant. It contains an acrid volatile principle, green colouring matter, vegetable albumen, some salts, and a peculiar alkaloid, first discovered by Brandes and named by him *aconitina*; as this substance has been introduced into the London Pharmacopœia, the process for preparing it, and its properties will be described amongst the pharmaceutical preparations of the plant. Aconite leaves or root yield their active principles completely to alcohol, but very imperfectly to water.

THERAPEUTICAL EFFECTS.—In large doses the leaves or root of aconite are highly poisonous, appearing to produce death by a direct depression of the vital powers: thus, the most manifest symptoms are slight wandering delirium, the consciousness being partly retained, generally muscular tremors or very slight convulsions, and failure of the circulation; in addition to which a feeling of numbness and tingling is experienced over the entire of the body; a diminution of the temperature of the surface takes place, and there is frequently loss of sight, the pupil of the eye which was at first contracted becoming dilated; and death by *syncope* takes place. As a medicine it has been used with the most marked benefit in all forms of painful diseases even when accompanied by inflammation; this is well illustrated by its employment in the treatment of acute rheumatism, and of neuralgia. In the former of these diseases it has proved in the hands of Dr. Lombard of Geneva a complete specific, and his statements have been fully borne out by the experience of Dr. Fleming in his carefully conducted investigations; the alcoholic extract given in doses of from half a grain to eight grains frequently repeated, curing the severest attacks of febrile rheumatism in from two to six days, and affording marked relief within an hour or two after the first dose is taken. It has not, however, proved so successful in the practice of other British physicians, which is probably owing to the inertness of the officinal extract of the London Pharmacopœia; in some cases in which I employed the powdered leaves, the beneficial results were most marked. I have employed the tincture with the most marked benefit in painful affections of the stomach whether dependant on organic disease or not; and in some obstinate cases of violent gastrodynia which had resisted all other remedies for years its effects were most decided, perfect recovery resulting from its use for a short time. In neuralgic pains, particularly *tic douloureux*, applied externally in the form of extract or tincture, it seldom fails to ameliorate the suffering, and in many instances will cure the disease. It is not so useful in *sciatica* or *lumbago*. It has also been employed in the treatment of many other diseases, but in none of them has its efficacy been well established. Aconitina has been used in the same cases as the preparations of the leaves or root of aconite, but owing to its high price and its intensely poisonous properties, it has hitherto been but little employed.

DOSE AND MODE OF ADMINISTRATION.—The powder of the root or leaves may be given in doses of from gr. iij. to gr. xij. gradually increased until some effects are produced.—*Extractum Aconiti*, L. E.

("Fresh aconite leaves, ℥ij., bruise them sprinkled with a little water in a stone mortar, then press out the juice and evaporate it unstrained to a proper consistence," L.—"Take of fresh leaves of monkshood any convenient quantity, beat them into a pulp, express the juice, subject the residue to percolation with rectified spirit, so long as the spirit passes materially coloured; unite the expressed juice and the spirituous infusion; filter, distil off the spirit, evaporate the residue in the vapour bath, taking care to remove the vessel from the heat so soon as the due degree of consistence shall be attained," E.). As aconite leaves yield their active principles almost entirely to alcohol, and but very partially to water, the Edinburgh preparation only can be active. The dose of it is gr. ij. to gr. viij. repeatedly.—*Tinctura radice Aconiti*, D. (Take of aconite root, dried, and cut small, ten ounces; rectified spirit, one pint: macerate for fourteen days, strain, express, and filter). Dose, min. viij. three times a day, increased by one minim daily until its effects are produced. A stronger tincture and that which has been in general use until the publication of the last edition of the Dublin Pharmacopœia, is prepared by the following process of Dr. Fleming:—(Take of the tubers of *Aconitum napellus*, carefully dried and finely powdered, 3xvj. (Troy); rectified spirit, f3xvj.; macerate for four days, then pack into a percolator; add rectified spirit until f3xxiv. of tincture are obtained). This tincture is beautifully transparent, of the colour of sherry wine, and has a slightly bitter taste. Dose, min. v. three times a day. The strength of this preparation compared with that of the Dublin College is about 3 to 2. Either of them should be used with caution; the strong tincture is the best form for external use, when aconitina cannot be procured, and this is an important advantage which Dr. Fleming's tincture possesses, namely, that it answers for both purposes, while that of the Dublin Pharmacopœia is too weak for external application, and there can be no more danger in giving internally a small dose of a strong tincture than a larger dose of a weak one; his tincture is also of a more uniform strength inasmuch as the quantity of the root employed being in excess, the spirit is always fully saturated.—*Extractum Alcoholicum Aconiti*, FLEMING. (Prepared by distilling off the spirit from the tincture, at a low temperature, until the consistence of an extract is obtained. The process should be completed in a vapour bath). Its colour is dark brown or almost black; it has an agreeable smell, and a bitter taste. Dose, one-third of a grain thrice daily, commencing with one-sixth of a grain.—*Unguentum Aconiti*, (The alcoholic extract, 1 part; prepared lard, 2 parts; mix). An excellent application rubbed over the painful part in neuralgia.—*Aconitina*, L., (Aconite root, dried, and bruised, ℥ij.; rectified spirit, cong. iij.; dilute sulphuric acid; solution of ammonia; purified animal charcoal, of each, a sufficiency. Boil the aconite with a gallon of the spirit for an hour in a retort with the receiver adapted to it, pour off the liquor, and again boil the residue with another gallon of spirit and with the spirit recently distilled, and pour off the liquor; let the same be done a third time. Then press the aconite, and all the liquors being mixed and strained, let the

spirit distil; evaporate what remains to the proper consistence of an extract. Dissolve this in water and strain; evaporate the liquor with a gentle heat that it may thicken like a syrup. To this add of dilute sulphuric acid mixed with water, as much as may be sufficient to dissolve the aconitina; then drop in the solution of ammonia, and dissolve the precipitated aconitina in dilute sulphuric acid and water mixed as before; afterwards mix in the animal charcoal, frequently shaking them during a quarter of an hour. Lastly, strain, and solution of ammonia being again dropped in, that the aconitina may be precipitated, wash and dry it). Aconitina is in the form of a white semi-crystalline powder, odourless, with a bitter taste. It is very soluble in sulphuric ether, less so in alcohol, and very slightly soluble in water. When perfectly pure, this alkaloid is so powerful a poison "that a fiftieth of a grain has endangered the life of an individual," (Pereira). As usually met with it is of a grayish yellow colour, in which state it is very impure. Aconitina possesses, but of course much more powerfully, the same medicinal virtues as monkshood; it has been principally used in the form of ointment in *tic douloureux*, and other neuralgic pains. But it does not appear to possess sufficient advantages over the alcoholic extract, as (considering its enormous price, 3s. 6d. to 4s. 6d. a grain) would warrant its employment as a medicinal agent. It cannot be administered internally with safety.—*Solutio Aconitinæ*, TURNBULL. (Aconitina, gr. viij.; rectified spirit, f3ij.; dissolve). Applied externally by means of a small sponge.—*Unguentum Aconitinæ*, FLEMING. (Aconitina, gr. xvj.; rectified spirit, min. xvj.; rub well together, and add of axunge 3j.; mix). Employed by friction with the finger during several minutes. If there be any abrasion of the cuticle, the external application of aconitina cannot be unattended with danger.

In cases of poisoning with monkshood, emetics should be immediately administered, and the most active stimulants both external and internal should be employed. Tannin has been recommended as an antidote, in consequence of its forming insoluble compounds with the vegetable alkaloids; but most of the insoluble tannates are digestible in the human stomach.

AMYGDALÆ AMARÆ OLEUM. *Essence (Volatile oil) of bitter-almonds.* The bitter-almond tree has been described in the division *Emollients*.

PREPARATION.—Oil of bitter-almonds is obtained by submitting bitter-almond cake, left after the separation of the fixed oil by expression, to distillation with water.

PHYSICAL PROPERTIES.—As usually met with it is of a golden-yellow colour, but when obtained from almonds which have been blanched it is colourless when first drawn. It is transparent, with an agreeable *ratafia* odour, and an acrid, warm, bitter taste. It is heavier than water, its specific gravity being 1.083.

CHEMICAL PROPERTIES.—Oil of bitter-almonds, as prepared by distillation, consists of from 8·5 to 14·33 per cent. of pure hydrocyanic acid, mixed with *benzoic acid*, *benzoïn*, *benzimide*, and *hydruret of benzoil*. Its poisonous and medicinal properties depend on the hydrocyanic acid, which may be completely removed from it by repeated distillation from a solution of caustic potash. The oil is very soluble in alcohol and ether; by agitation with water, a portion of the hydrocyanic acid is dissolved out, and the water acquires the peculiar odour and taste of the acid.

Adulterations.—Oil of bitter almonds has been recently much adulterated, but chiefly on the continent. According to Zeller, the best tests for its purity are its high specific gravity, and its *clear* solubility in sulphuric acid, with a reddish-brown coloration, and without any visible decomposition.

THERAPEUTICAL EFFECTS.—As the medicinal properties of this oil depend on the hydrocyanic acid it contains, its effects and uses are of course similar to those of that acid, for which it has been proposed as a substitute; but as its strength is very variable, it is scarcely adapted for internal use. It should be borne in mind that the oil of bitter-almonds is at least four times the strength of officinal prussic acid.

DOSE AND MODE OF ADMINISTRATION.—Min. ij. may be dissolved in f3ss. of rectified spirit, and of this solution min. iij. to min. vj. may be given occasionally.—*Vegetable Hydrocyanic Acid*, SCHREDER. (Oil of bitter almonds, min. iv.; rectified spirit; and distilled water, of each, min. xxx.; dissolve). Dose, min. ij. to min. iij. every second or third hour.

ANTIMONIUM TARTARIZATUM. *Tartar emetic* (described in the division *Diaphoretics*), when administered in full doses frequently repeated, acts on the human system as a direct *sedative* or *contra-stimulant*, this effect being most manifest when it is given in inflammatory diseases. Under the influence of doses of one, two, or three grains repeated every hour, or every second hour, the nausea, vomiting, or purging which are produced by the first or second dose ceases entirely, the force and frequency of the heart's action is lowered, and local inflammation is arrested. In Lepelletier's essay, two cases of pneumonia are mentioned, in one of which the pulse was reduced from 120 to 34 beats per minute in nine days, and in the other from 72 to 44 beats per minute in three days, under the use of continued doses of tartar emetic. This contra-stimulant power of tartar emetic is applied with benefit to the treatment of acute inflammations, in which it is administered either alone or as an adjunct to bleeding or other antiphlogistic means. The diseases in which this plan of treatment has been found most beneficial are *acute pneumonia* and *pleuritis*. British practitioners usually employ either local or general bleeding in these diseases, in conjunc-

tion with tartar emetic; but, although in pleuritis the combined abstraction of blood will in most instances be absolutely requisite, many cases of pneumonia are cured as speedily and as effectually by the use of tartar emetic alone; indeed by many physicians bleeding is considered singularly injurious to the development of the sedative influence of this medicine. This mode of administering tartar emetic has also been employed in the treatment of bronchitis, of arachnitis, and of many other acute inflammations, but in none are its beneficial effects so manifest as in inflammation of the lungs, and in pleurisy. As a contra-stimulant, tartar emetic is given in doses of from half a grain to two grains every hour or every second hour, dissolved in a small quantity of water—one or two ounces at most; the best vehicle for its administration is orange-flower water. The first dose or two should not exceed half a grain, and the patient should not be permitted to drink, so as if possible to avoid producing vomiting; when once a tolerance of the medicine is produced in the system, the quantity taken may be rapidly increased.

CHLOROFORMUM, D. *Chloroform* ; *Terchloride of Formyl*. In the last edition of this work I described this fluid under the name of *Chloride of Carbon*, but since that time its properties and mode of preparation have been most carefully investigated, owing to the important discovery of its anæsthetic properties by Professor Simpson of Edinburgh. Chloroform was first obtained in 1831 by M. Soubeiran, and shortly afterwards discovered also by Liebig, but its composition and chemical characteristics were for the first time carefully investigated by Dumas in 1835. Many processes have been proposed for its preparation, the following is the officinal one of the Dublin Pharmacopœia:—

PREPARATION.—"Take of chlorinated lime, ten pounds; fresh-burned lime, five pounds; water, four gallons; rectified spirit, twenty-five ounces; peroxide of manganese, in fine powder, two drachms. Slake the lime with a quart of the water, first raised to the boiling temperature, and having placed the slaked lime and the chlorinated lime in a sheet-iron or copper still, pour on the residue of the water first mixed with the spirit, and raised to the temperature of 100°. Connect now the still with a condenser, and apply heat, which, however, must be withdrawn the moment the distillation commences. The distilled product, the bulk of which need not exceed a quart, will occur in two distinct strata, the lower of which is the crude chloroform. Let this be agitated twice in succession, with an equal volume of distilled water, and then in a separate bottle with half its volume of pure sulphuric acid. Lastly let it be shaken in a matrass with the peroxide of manganese, and rectified from off this at a very gentle heat. The specific gravity of chloroform is 1496. The lighter liquid which distils over with the chloroform, and the water used in washing the latter, should be preserved with the view of their being introduced, with a new charge, into the still in a subsequent process."

PHYSICAL PROPERTIES.—Chloroform is a transparent, colourless, oily-looking liquid, heavier than water, with a sweetish cooling taste and an ethereal odour which is agreeably fragrant when the preparation is quite pure; it is extremely volatile. The specific

gravity of it when prepared according to the Dublin process is 1496, but Professor Gregory of Edinburgh states that he has obtained it so high as 1500.

CHEMICAL PROPERTIES.—It is a compound of 2 equivalents of carbon, 1 of hydrogen, and 3 of chlorine, its formula being $C^2 H Cl^3$. It is nearly insoluble in water, requiring 2000 parts for its solution, to which, however, it imparts its agreeable odour; it is soluble in alcohol and ether. Chloroform boils at 141° , is scarcely inflammable, kindling with difficulty, when it burns with a greenish flame. Concentrated sulphuric acid when agitated with chloroform has no action on it, and is therefore made use of in the process of purifying it; but, as has been recently pointed out by Christison, if the acid be left in contact with the chloroform for any length of time, as was proposed by Gregory for its thorough purification, although it does not effect it immediately, the chloroform does not keep, undergoing decomposition rapidly and evolving chlorine: this, then, must be borne in mind by the operator when preparing it.

Adulterations.—A great deal of spurious and badly prepared chloroform has been and still is met with in the shops; as a consequence most probably of which, fatal results have followed its use, and its general employment as an anæsthetic agent has been retarded. When pure it is *perfectly* transparent; it should be of the prescribed density, should have no effect on litmus or turmeric paper, and should leave no *after-odour* when a small quantity is allowed to evaporate on the palm of the hand. Professor Gregory has proposed the following test for ascertaining the purity of chloroform:—Perfectly *colourless* sulphuric acid of the density of 1840 at least, when agitated with pure chloroform remains colourless, but if the chloroform be impure it becomes yellow or brown.

THERAPEUTICAL EFFECTS.—Since its discovery chloroform had been more or less used on the continent and in America in the liquid form as a sedative, but was very little employed in this country. The chief diseases in which it had been administered with benefit were asthma, spasmodic cough, and cancerous and other painful affections; in cancer it is most highly praised by Mr. Tuson of London, but general experience has not confirmed his extravagant statements. More lately it has been given with good effect in obstinate vomiting, in asthma and in hysteria; it has also been employed in the treatment of spasmodic cholera. Externally applied it allays pain and local irritation, and is therefore used with good effect as an addition to liniments or ointments in neuralgia, muscular rheumatism, and cutaneous diseases, attended with itching, especially prurigo, and lichenoid eruptions; it may also be applied undiluted in these affections. But it is for its effects when inhaled in the form of vapour, that chloroform has become so important a therapeutical agent. Towards the close of the year 1846 the discovery was made in the United States of America, that a state of partial coma with insensibility to pain could be produced by the inhalation of the vapour of sulphuric ether, and this discovery was

rapidly taken advantage of, for the purpose of preventing any suffering to the patient during surgical operations. It was almost immediately found, however, that ether inhalation was very uncertain in its effects, producing in many persons violent excitement, spasmodic action of the muscles, and delirium, and in some instances death even followed its employment; the attention of the members of the profession, over the whole globe, I might say, was therefore at once actively engaged with the view of discovering a safe and effectual substitute for it; the honor of this, one of the most important discoveries of modern times, fell to the lot of Professor Simpson of Edinburgh, who in November, 1847, ascertained that chloroform possessed the desired properties. The vapour of chloroform when inhaled in quantity not exceeding that evolved by half a drachm produces a feeling of fulness in the head, dizziness, and partial loss of consciousness, with usually pleasurable sensations: the effects vary according to individual temperament, but in all they more or less resemble semi-intoxication. If the quantity inhaled be augmented, total insensibility is quickly produced, usually in from thirty seconds to two minutes, the insensibility being marked by slight stertorous breathing, muscular relaxation and fixing of the eyes. If the inhalation be now stopped, perfect consciousness will be restored, usually in from five to six minutes, the individual recovering without any remembrance of what had taken place. The circulation is but little affected during the state of anæsthesia, the strength of the pulse being generally diminished while its frequency is increased. The anæsthetic condition may be kept up for hours with impunity, as is often done in childbirth, by a cautious continued use of the inhalation. The therapeutical applications of the inhalation of chloroform are sufficiently manifest, its effects being so fully explained above; but the two purposes for which it is specially used require to be shortly noticed, namely the prevention of pain during surgical operations and in child-birth. At first, much opposition was given to the employment of anæsthetic agents for the induction of insensibility during operations, and the occurrence of an occasional fatal case even where chloroform had been inhaled with all due precautions still affords its opponents an argument against its use; but the magnitude of the boon conferred is so great, and the proportionate risk of ill effect so small, that it is now used almost universally by surgeons in even the most trivial operations. There is one class of operations—the reduction of dislocations, in which it not only prevents pain, but by its relaxing effect on the muscular system removes all difficulty in the reduction, so that the complicated apparatus of compound pulleys, &c. is no longer required. In the reduction of strangulated hernia, and in the introduction of a catheter in spasmodic stricture, its relaxing effects are also especially advantageous. In operations about the mouth and nose only, is the production of anæsthesia contra-indicated, and this depends on the danger that might result from the flow of blood into the air passages during the insensible state of the

patient. It is, however, to the use of chloroform during child-bearing that most opposition has been given, and a fierce controversy has raged between obstetrical practitioners on the subject, since it was first employed by Professor Simpson; scripture authority even being brought to bear on both sides of the question. But as I am not myself a practitioner in midwifery, and consequently cannot speak from personal experience, I wish merely to deal with facts. In Edinburgh anæsthesia is induced—to speak in general terms—in *every case* of labour, natural or preternatural, and with safety to both mother and child; while the opinion of the majority of accoucheurs in this and most other large cities, as far as I can judge from what has been written on the subject, is well expressed in the following extract from the second edition of Dr. Churchill's *Midwifery*:—"As to its exhibition in *natural labour*, as I do not believe that in the large majority of cases convalescence is at all impeded by the suffering, I cannot see the necessity or even the propriety of urging the employment of anæsthesia in every case; and I do feel that even greater caution ought to be used than in operative midwifery. We may be justified in running some risk when an important point is to be gained, such as perfect quietness during an operation, which we should not be justified in incurring merely to relieve pain; thus, in hysterical or nervous patients, in those labouring under nervous affections or organic diseases of the lungs or heart, &c., I do not think we ought to employ it." It is right, however, to add, that in no instance has a fatal result followed the inhalation of chloroform in midwifery practice. In conclusion, anæsthesia has been employed in the treatment of asthma, delirium tremens, hysteria, neuralgic affections, &c.; but our experience of it is too limited as yet to draw any conclusions as to its therapeutic value in these affections. In one case of hay asthma I have seen the access of the disease kept off by constantly smelling chloroform, which the patient carried about with him in a bottle for the purpose.

DOSE AND MODE OF ADMINISTRATION.—Internally in the fluid form, min. v. to min. xxx. suspended in water by means of mucilage or dissolved in it with the aid of a little spirit; in consequence, however of its great volatility it should always be prescribed in draughts: for external use fʒj. to fʒiv. may be mixed with half a pint of any liniment, or fʒss. added to ʒj. of an ointment. *Anæsthesia* is usually produced by the inhalation of the vapour produced by from fʒj. to fʒij. It is most effectually and safely administered in the manner first proposed by Professor Simpson: namely, by pouring the chloroform into the hollow of a handkerchief folded in the form of an inverted cone; at first fʒj. only should be used, and if the desired effect be not produced in about two minutes, the same quantity should be renewed. Various forms of *inhalers* have been proposed for the administration of the vapour of chloroform, but I must confess that I prefer the simple handkerchief. The chief points to be attended to are:—1st. that the patient should be lying on his back with the head slightly raised; 2nd, that he should be permitted at first to breathe

atmospheric air mixed with the chloroform, which is effected by not bringing the handkerchief too close to the mouth and nose at once; 3rd, that the vapour should be altogether withdrawn as soon as insensibility is produced, which is usually evidenced by the occurrence of slight stertorous breathing, for the condition can be kept up for any length of time that may be requisite, by the occasional reapplication of fresh chloroform in the handkerchief; 4th, the patient's stomach should be empty when the inhalation is commenced, as otherwise vomiting is apt to be produced; and 5th, should fainting or other evidence of sinking occur, the best restorative is atmospheric air, ammonia also may be applied to the nostrils, the cold douche on the head used, or even artificial respiration may be had recourse to, *but no stimulants should be given by the mouth.* There is but one other remark which I have to make for the benefit of those inexperienced in the use of chloroform, namely, that during the process of inhalation, just before insensibility is produced, there is usually a struggle on the part of the patient; *this must be resisted, and the charged handkerchief kept just at that time closely applied to the mouth and nostrils.*

CONIUM, E. CONII FOLIA ET FRUCTUS, L. CONIUM MACULATUM, FOLIA, D. *Hemlock.* The leaves (and fruit, L.) of *Conium maculatum*. Indigenous; belonging to the Natural family *Umbelliferae* (*Apiaceae*, Lindley), and to the Linnæan class and order *Pentandria Digynia*.

BOTANICAL CHARACTERS.—Biennial; Root, fusiform, whitish, 6-12 inches long; Stem 2-6 feet high, striated and spotted with purple, smooth, glaucous, hollow, much branched upwards; Leaves, large, tripinnate; leaflets, lanceolate, pinnatifid with acute and often cut segments; Flowers, white, in umbels of many general as well as partial rays; *General involucre* usually 3-7 leaflets; *Partial involucre* of 3 leaflets on one side; Fruit, ovate, compressed laterally, with five primary undulato-crenate ridges. The whole plant, when bruised, emits a peculiar fetid odour like that of mice.

PREPARATION.—The leaves are officinal in the three British pharmacopœias, they should be gathered when the plant is in full flower, the stalks carefully picked out, and the leafy part dried with a stove heat, excluded from the light. For medicinal purposes they should be kept in well-stopped opaque bottles or jars, but as they lose much of their virtues by keeping, the druggist's stock should be renewed every year. The seeds are collected when fully ripe, they are more active than the leaves and preserve their medicinal powers for a much longer period.

PHYSICAL PROPERTIES.—Hemlock leaves in the fresh state are of a glaucous-green colour, and possess remarkably the characteristic odour of the plant; by drying they acquire a dull greyish-green colour, and lose much of their odour. They have a nauseous bitter taste. The fruit has a weaker odour, its taste is bitter, and somewhat acid.

CHEMICAL PROPERTIES.—Hemlock leaves and fruit contain a peculiar alkaloid which has been named *conia* (*conein*, or *conicin*), a volatile odorous principle, albumen, resin, colouring matter, and some salts. The active principle of the plant is the alkaloid *conia*; it is a

colourless oily liquid, lighter than water, with a peculiar, penetrating, very disagreeable odour, and an intensely acrid taste; it is nearly as active a poison as pure prussic acid. *Conia* is obtained by the distillation of the leaves or fruit with a caustic alkali; it exists in the greatest quantity in the full grown green fruit, eight pounds yielding half an ounce of *hydrated conia* (Christison). The composition of this alkaloid is $C^{16} H^{16} N$. On triturating the leaves or fruit of hemlock with caustic potash, the peculiar odour of *conia*, which should not be confounded with that of the plant, is emitted; and as the medicinal virtues depend on the presence of this alkaloid, a ready test is thus afforded of ascertaining the goodness of any of the preparations of hemlock. The leaves and fruit yield their active properties to water, alcohol, oils, and fats.

Adulterations.—Other umbelliferous plants which bear a general resemblance to hemlock are frequently confounded with it, and their leaves often sold for those of the true plant. The distinguishing botanical characteristics of the plant are, its smooth purple-spotted stem, and its unilateral partial involucre; the fruit is readily known by its undulato-crenate primary ridges. Chemically, all parts of the plant are known by the peculiar odour of *conia* evolved on trituration with caustic potash; and this test, as before remarked, is also applicable for ascertaining the quality of the officinal preparations of hemlock.

THERAPEUTICAL EFFECTS.—From the investigations which have been recently made as to the action of hemlock, particularly those of Professor Christison and Mr. Judd, it would appear that its influence is chiefly exerted on the nerves of motion, and that its medicinal powers are those of a direct sedative. When taken in poisonous doses, the symptoms preceding death are very similar to those produced by asphyxia from any cause; thus “it does not excite convulsive spasms, or bring on insensibility—but it exhausts the nervous energy of the spinal cord and voluntary muscles, occasioning merely convulsive tremors and slight twitches, and eventually general paralysis of the muscles, and consequent stoppage of the breathing” (Christison). Much difference of opinion exists as to the action of hemlock when employed as a medicine, and consequently as to the diseases in which it proves beneficial; this arises from the fact, that the preparations of hemlock which were in general use until very lately were perfectly inert; for since the discovery of the active principle of the plant, it has been satisfactorily shown, that the application of even a moderate degree of heat, when continued for any time, causes it to undergo decomposition, and therefore that the extract (the preparation most generally employed), when prepared according to the directions of the Dublin and London Pharmacopœias, is deprived almost completely of its medicinal virtues. In the present day, but little faith is placed in the virtues of hemlock as a deobstruent and alterative in the treatment of glandular or visceral enlargements, of scrofulous affections, of secondary syphilis, or of chronic skin diseases, for which it was at one time highly esteemed.

I have derived very beneficial results from the use of hemlock in many painful affections, some of which were attended with inflammation; the preparation which I employed was the expressed juice carefully prepared from the fresh leaves gathered when the plant was in full flower. The diseases in which I principally used it were the various rheumatic affections—both acute and chronic, neuralgia, senile gangrene, and cancerous diseases of various parts of the body; in all of which I have found it alleviate pain and diminish nervous excitement. On the whole from the experience which I have had of it, I am inclined to think that hemlock will be found an anodyne and sedative of much power, an opinion which from numerous communications that I have recently received is confirmed by the experience of others, who have employed it in consequence of my publications on its medicinal properties in the 26th and 28th volumes of the first series of the Dublin Journal of Medical Science. Hemlock has been employed externally in the form of cataplasm or ointment to cancerous and painful ulcerations, and to tender glandular enlargements. In several cases in my practice in which the use of the expressed juice of hemlock had been persevered in for some time, and the dose much increased, the patients complained of great dryness with a painful feeling of constriction of the pharynx, which, however, soon disappeared on the suspension of its use and the administration of an active cathartic. In a few instances, also, slight head-ache was experienced. These are the only physiological effects which I have seen produced by hemlock, although I have employed it very extensively for some years back; and in no instance have I seen any injurious consequences follow its administration.

DOSE AND MODE OF ADMINISTRATION.—The dose of the powder of the leaves, a bad form, is from gr. v. to gr. x. three or four times a day; of the powder of the seeds gr. iij. to gr. vj. may be given; the quantity should be gradually increased.—*Extractum Conii*, D. L. E. ("Take of fresh hemlock leaves, collected when the plant begins to flower, any convenient quantity: the method of preparation is the same as for *Extractum Belladonnae*," D.—"Fresh hemlock leaves, lbj.; bruise them, sprinkled with a little water, in a stone mortar; then press out the juice, and evaporate it unstrained to a proper consistence," L.—"Take of conium, any convenient quantity; beat it into a uniform pulp in a marble mortar, express the juice and filter it. Let this juice be evaporated to the consistence of a firm extract, either in a vacuum with the aid of heat, or spontaneously in shallow vessels exposed to a strong current of air, freed of dust by gauze or screens.—This extract is of good quality only when a very strong odour of conia is disengaged by degrees on its being carefully triturated with Aqua potassæ," E.). Dose, gr. iij. to gr. v. gradually increased. This is always an uncertain preparation, and does not keep well.—*Tinctura Conii*, L. E. ("Hemlock leaves, dried, 3v.; cardamom, bruised, 3j.; proof spirit, Oij.; macerate for 14 days, and strain," L.—"Fresh conium leaves, 3xij.; tincture of cardamom, Oss.; rectified spirit, Oiss.; bruise the leaves, express the juice strongly; bruise the

residuum, pack it firmly in a percolator; transmit first the tincture of cardamom, and then the rectified spirit, allowing the spirituous liquors to mix with the expressed juice as they pass through; add gently water enough to the percolator for pushing through the spirit left in the residuum. Filter the liquor after agitation," E.). The tincture of the Edinburgh College is a much superior preparation to that of London as being prepared from the fresh leaves, nevertheless as the process requires some nicety of manipulation, it is apt to vary in strength, which the presence of the tincture of cardamoms will prevent us from judging of; the dose of it is from min. xx. to min. xl. gradually increased.—*Succus Conii*, (Fresh hemlock leaves, any quantity; express the juice strongly; set aside for 48 hours, pour off the clear supernatant liquor, and add to it a fifth part of rectified spirit). This is the most certain of the preparations of hemlock, as it is of a uniform strength, and keeps well. Dose, min. xxx. gradually increased to fʒj. every third or fourth hour, its effects being carefully watched. It is best administered in camphor mixture or in distilled water sweetened with simple syrup, or syrup of red poppies.—*Pilule Conii compositæ*, L. (Extract of hemlock, 3v.; ipecacuanha, powdered, ʒj.; mixture of acacia, as much as may be sufficient; beat them together until they are incorporated). Dose, gr. v. three times a day; intended for an anodyne and expectorant in hooping cough, bronchitis, and the incipient stage of phthisis, but, from the observations made above on the extract, its power must be very feeble.—*Cataplasma Conii*, L. (Extract of hemlock, ʒij.; water, Oj; mix, and add linseed, bruised, as much as may be sufficient to make it of a proper consistence). A soothing poultice to painful ulcers or glandular enlargements. The fresh leaves, bruised, would form a much better application.—*Emplastrum Conii*, (Yellow wax, 2 parts; resin, and olive oil, of each, 1 part; soap plaster, a sixth part; melt together, and add to the mass when it begins to cool, powdered hemlock, 2 parts; mix thoroughly). For neuralgic and rheumatic pains; in cancer of the stomach, liver, or uterus, over the site of these organs; and in glandular enlargements in the abdomen. *Conia* has been but little employed in medicine as yet; according to Nega who has published some observations on it, it is a most powerful sedative; he directs one grain to be dissolved in fʒij. of orange flower water, and of this he gives four minims five times a day.

INCOMPATIBLES.—The caustic alkalies; the vegetable acids; and vegetable astringents.

In cases of poisoning with hemlock, the same treatment should be followed as in poisoning with monkshood, (see page 299).

CREASOTUM. *Creasote* (described in the division *Astringents*), when given in poisonous doses, appears from the observations of Dr. Rose Cormack, to resemble prussic acid in its sudden depressing

action on the heart, as well as in the temporary nature of its toxicological operation. In medicinal doses, independently of its astringent property already described (see page 57), it operates as a sedative and calmative; it has been principally used in nausea and vomiting, in checking which it proves highly beneficial. It is particularly useful in the morning sickness of pregnancy, and in cases of hysteric vomiting. Creasote will also be found very efficacious in allaying vomiting when it arises from nervous irritability, or functional disorder of the stomach; but it generally fails when organic disease is present, or where the vomiting is symptomatic of diseases of other organs. In the obstinate vomiting of sea-sickness, this remedy has been found by some to prove useful, and in all the nostrums of the present day for preventing sea-sickness creasote is a principal ingredient. In *neuralgia* and in *phthisis*, it has been highly praised by many as being almost a complete specific, but its efficacy in these diseases has not been well established.

DOSE AND MODE OF ADMINISTRATION.—Min. j. to min. ij. gradually increased to min. v. or min. vj. dissolved in at least an ounce, or an ounce and a half of some aromatic water; or made into an emulsion with distilled water by means of sugar or yolk of egg. In the administration of creasote, it should be borne in mind that its action is temporary, and consequently that the dose should be frequently repeated.—*Mistura Creasoti*, E. (Creasote; and acetic acid, of each, min. xvj.; compound spirit of juniper; and syrup, of each, f̄3j.; water, f̄3xiv.; mix the creasote with the acid, add gradually the water, and lastly, the syrup and spirit). An excellent form for the administration of this medicine, the spirit of juniper concealing its disagreeable taste. Dose, f̄3j. to f̄3ij.; f̄3j. contains min. j. of creasote.

DIGITALIS has been described in the division *Diuretics*, but as its active principle *digitaline* acts only as a sedative, I have preferred describing the mode of preparation and properties of that substance here.

PREPARATION.—*Digitaline*; “Take any quantity of dry digitalis, reduce it to coarse powder, and form it into a paste with spirit of the density .860; separate the tincture by strong pressure, and repeat the operation a second time. Distil the alcoholic liquor and treat the residue with water acidulated with acetic acid; filter and add to the clear liquor a concentrated infusion of nut-galls as long as any precipitate is formed. Collect this precipitate carefully, and triturate it with an equal weight of finely powdered litharge, adding a few drops of spirit. Digest for a short time with rectified spirit (dens. .840), at a temperature not exceeding 104° F. Filter, distil off the spirit and agitate the residue with warm sulphuric ether, when the digitaline will be left as an insoluble residuum.” HOMOLLE and HENRY.

PROPERTIES.—*Digitaline* thus prepared is in the form of a white powder; it has an excessively bitter taste, and is inodorous, but the smallest quantity of it produces violent sneezing. It is scarcely soluble in cold water or ether, a little more so in boiling water,

but is very soluble in either strong or weak spirit. It is perfectly neutral.

Digitalis administered in large doses acts as a narcotico-acrid poison producing giddiness, great debility, stupor, slow, feeble and intermittent pulse, an abundant flow of saliva, cold sweats, and death immediately preceded by coma and convulsions. In medicinal doses, when its use has been continued for some time, it operates as a direct sedative, its influence being chiefly manifested on the heart and arterial system; this is indicated by the diminished force and frequency of the pulse, which is also sometimes irregular, and by the enfeebled action of the heart itself. If the use of digitalis be continued under these circumstances, although the dose be not increased, all the symptoms of poisoning come on, indeed in many cases will appear some days after its administration has been stopped; hence it is evident that this medicine accumulates in the system, and therefore in cases where its use has been continued for any period, the administration of the remedy should be occasionally suspended, particularly as soon as its constitutional effects become obvious. From the sedative influence which digitalis exerts on the heart, it may be employed in all cases attended with over-excitement of the vascular system: but where much inflammation is present, it is not sufficiently powerful as an antiphlogistic to be relied on, to the exclusion of more active treatment. It is in diseases of the heart and large arteries that this medicine is found most beneficial, and whenever the curative indication will be best fulfilled by diminishing the impulse of the heart, and by lowering the circulation generally, no remedy will produce these results so completely and so certainly as digitalis. It thus proves useful in simple hypertrophy of the heart, in nervous palpitations, in increased action of that organ arising from functional derangement not from organic disease, in aneurism of the aorta, and in active hemorrhages where the pulse is quick, hard and throbbing; its employment is contra-indicated in hypertrophy of the heart with or without dilatation, when that state is produced by obstruction from any cause to the circulation of the blood, or by regurgitation from insufficiency or other disease of the valves. Digitalis has also been used in cases of insanity and of epilepsy; in the latter affection, when not dependant on organic disease, it often proves singularly beneficial when given in very large doses, so as to bring the system rapidly under its influence; in some cases which I saw with Dr. Corrigan, recovery took place very rapidly under the following mode of employing this remedy:—fʒij. of the infusion of digitalis were given every night at bed-time until its constitutional effect was produced, which was usually after the fourth or fifth dose; its use was then suspended for two or three nights according to circumstances, and then the same quantity given as before; as soon as the system became affected, the number of fits was diminished, and under the continuance of this plan of treatment for a short time, their recurrence soon ceased altogether. In the employment of digitalis as a medicine, its effects require to be carefully watched,

and whenever its use is continued for any length of time, the patient should not be allowed to use any active exertion, and should be seen at least once daily by the medical attendant.

Digitaline is about a hundred times more active than *digitalis*, the sedative properties of which it appears to possess in a concentrated degree; a tenth of a grain having frequently reduced the pulse to 40 beats in the minute in from eight to ten hours after it had been taken. The smallest over-dose of it produces nausea and obstinate vomiting which lasts for many hours.

DOSE AND MODE OF ADMINISTRATION.—As a sedative the dose of the preparations of *digitalis* are as follows:—of the powder, gr. j. to gr. iij.; of the infusion, f3j. to f3ij.; of the tincture, f3ss. to f3iss.—*Succus Digitalis*, (Prepared in the same manner as *Succus Conii*, page 308). Dose, f3j. to f3ij.—*Extractum Digitalis*, L. E. (“Fresh foxglove leaves, lbj., bruise them sprinkled with a little water in a stone mortar, then press out the juice, and evaporate it unstrained to a proper consistence,” L.—“Best prepared by any of the processes indicated for extract of conium, E.”). An uncertain preparation. Dose, gr. ss. to gr. j.—The dose of *digitaline* is from 1-12th to 1-10th of a grain repeated every sixth hour, its effects being most carefully watched.—*Granules of Digitaline*, (*Digitaline*, gr. xx.; powdered white sugar, 3j.; mucilage, sufficient to make 1000 granules). Each granule contains a fiftieth of a grain of *digitaline*. Dose, 4 to 5.

In cases of poisoning with foxglove, the stomach pump should be used, or powerful stimulating emetics immediately administered, and active stimulants both external and internal be assiduously employed.

LAURO-CERASUS, D. E. *Cherry-laurel leaves.* *Leaves of Cerasus lauro-cerasus*, D.—*Prunus lauro-cerasus*, E.; *Common Laurel*. A native of the shores of the Black Sea, whence it was introduced into Europe and the British Isles, where it now grows freely; it belongs to the Natural family *Rosaceæ* (*Drupaceæ*, Lindley), and to the Linnæan class and order *Icosandria Monogynia*.

BOTANICAL CHARACTERS.—An evergreen small tree; Stem smooth, much branched, 12-18 feet high; Leaves, large, bright glaucous green, coriaceous; Flowers, numerous, white, small, in axillary racemes; Fruit, an ovoid, blackish drupe about the size of a small cherry.

PHYSICAL PROPERTIES.—Cherry-laurel leaves are employed in the recent state for medicinal purposes; they emit an agreeable bitter-almond odour when bruised, and have a bitter rather astringent taste.

CHEMICAL PROPERTIES.—These leaves have not been accurately analysed; their properties depend on a volatile oil, which they yield by distillation with water; it resembles in odour and other properties the volatile oil of bitter almonds, and like it contains free prussic

acid. The leaves differ much in the quantity of this oil which they yield at different periods of their growth, and consequently in their activity; according to Christison the greatest quantity is obtained from the buds and unexpanded young leaves in the months of May and June, at which time they yield 6·33 grains of oil in one thousand; in July the proportion sinks to 3·1 grains, and in the following May to 0·6. Zeller states that they yield more oil when collected in cold wet weather than when gathered in a dry hot season. The water which comes over with the oil in the process of distillation acquires both its odour and taste, and is the only preparation of the plant which is employed in medicine.

Adulterations.—Cherry-laurel water varies much in activity according to the time of the year in which it is prepared, and the care with which it is distilled. Its strength is most easily ascertained by the nitrate of silver test as described for prussic acid (page 294). As it loses its activity by keeping, it should be distilled fresh every year.

THERAPEUTICAL EFFECTS.—Cherry-laurel leaves and their distilled water owe their virtues to the prussic acid which they contain, and consequently produce the same effects. An ounce of the distilled water has produced death in an adult. Cherry-laurel water is much employed in this country as a sedative in spasmodic cough, in phthisis, and in painful or spasmodic diseases of children; for the latter purpose its agreeable flavour renders it peculiarly eligible; it is, however, very liable to vary in strength, and should therefore be prescribed with caution.

DOSE AND MODE OF ADMINISTRATION.—*Aqua Lauro-cerasi*, D. E. (Fresh cherry-laurel leaves, lbj.; water, Oiiss.; “upon the leaves, chopped, and crushed in a mortar, macerate the water for 24 hours, and then draw over a pint of liquid by distillation, using a Liebig’s condenser and chloride of zinc bath. Filter the product through paper and preserve it in a well-stopped bottle,” D.—“Chop down the leaves, mix them with water, distil off a pint, agitate the distilled liquid well, filter it if any milkiness remains after a few seconds of rest, and then add ℥j. of compound spirit of lavender,” E.). The compound spirit of lavender is added as a colouring ingredient to prevent mistakes from the preparation being taken for common water, the odour, however, is quite sufficient for this purpose; and consequently it is omitted in the formula of the last edition of the Dublin Pharmacopœia. The dose for adults is from f3ss. to f3j.; for infants or children, min. ij. to min. x.

INCOMPATIBLES.—Same as for hydrocyanic acid. As is also the treatment in cases of poisoning.

POTASSII CYANIDUM.—*Cyanide of Potassium*. (*Cyanuret of Potassium*; *Hydrocyanate of Potassa*).

PREPARATION.—*Parisian Codex*, 1837. “Reduce proto-cyanuret of potassium

and iron to coarse powder, half fill a retort with it, place the retort in a good reverberatory furnace, adapt the tube to collect the gas; heat moderately to expel the water of crystallization, then raise the temperature so as to fuse the mass, which will be announced by a disengagement of gas; keep up the temperature so that the disengagement will be regular and moderate; increase the heat progressively, and maintain it at a very high degree for a quarter of an hour, close the extremity of the tube, close also the apertures of the furnace, and leave the whole to cool; then break the retort and carefully detach the upper stratum which forms a kind of well-fused enamel. This is the pure cyanide of potassium; include in a well-ground stoppered bottle, remove afterwards the spongy black mass which is found in the lower part; it is a mixture of cyanide of potassium, iron, and charcoal, include it also in bottles." Mr. Donovan of this city has added the following directions to the above process:—The retort should be of forged iron, a quicksilver bottle will answer perfectly, provided it be sound; in its screw plug must be fitted an iron tube so bent that its other extremity may be plunged half an inch below the surface of a little water in a cup. By this means the different steps may be more easily regulated, as the issue of gas is more conveniently observed. The iron bottle should be only half filled with recrystallized ferrocyanide of potassium; and as soon as the process is completed, when cold it may be cut in two by a chisel and heavy hammer. The black impure cyanide at the bottom of the retort is totally unfit for medicinal use.—It may be also obtained very readily and of great purity by passing a stream of hydrocyanic acid through an alcoholic solution of pure potash: a plan first proposed by WIGGERS.

PHYSICAL PROPERTIES.—Cyanide of potassium, thus procured, is a whitish, semi-transparent, crystalline mass, having an enamelled appearance. It is inodorous when quite dry, but if moistened it emits the odour of hydrocyanic acid. It has an acrid, alkaline, somewhat bitter taste.

CHEMICAL PROPERTIES.—It is composed of one equivalent of potassium and one of cyanogen. Exposed to the air it absorbs moisture and deliquesces, being converted into carbonate of potash by the absorption of carbonic acid from the atmosphere and the evolution of hydrocyanic acid. It has an alkaline reaction on vegetable colours; is fusible by heat without change, and unalterable even by a white heat, provided air be excluded. This salt is very soluble in water, but is insoluble in strong alcohol. By solution in water it is converted into the hydrocyanate of potassa.

Adulterations.—As commonly met with in the shops, this salt is seldom fit for medicinal use. When pure it should be perfectly white and afford a completely colourless solution with distilled water; if it be at all yellow, it contains iron which diminishes its activity much. It should also be perfectly free from odour, as if it have any smell of prussic acid, it contains water, is of uncertain strength, and is perhaps undergoing slow decomposition.

THERAPEUTICAL EFFECTS.—Cyanide of potassium possesses precisely similar properties to hydrocyanic acid, as a substitute for which it is used in medicine. Its advantages over that acid are its unvarying strength, and its permanence of constitution, when properly prepared and carefully preserved; but its great liability to deliquesce has prevented its general introduction into the practice of medicine. To remedy this defect, Mr. Donovan has suggested "that consumers should keep the cyanide of potassium in small wide-mouthed well-stoppered bottles, not quite filled with the salt,

but completely filled with alcohol of 0·800; which when of this strength exerts scarcely any solvent power on the cyanide, but will effectually preserve it from the deteriorating influence of the air. When a few grains are required for use, they may be drawn up by an iron wire like potassium out of naphtha, and heated in a spoon for a moment to drive off the adhering alcohol."

DOSE AND MODE OF ADMINISTRATION.—The dose of the pure cyanide of potassium is from one-eighth to one-fourth of a grain. If it be desirable to administer the prussic acid contained in the salt in a free state, this may be done by prescribing it in combination with any weak acid, as with citric acid, recent lemon-juice, or syrup of lemons.—*Syrup of Cyanide of Potassium*, MAGENDIE. (Cyanide of potassium, gr. viij.; simple syrup, f3xvj.; mix). Dose, f3ij. to f3vj. It is always better to prescribe this preparation in the form of draughts in consequence of its liability to become decomposed.—*Calmative Lotion*, TROUSSEAU. (Cyanide of potassium, gr. viij.; distilled water; alcohol; and sulphuric ether, of each, f3j. mix). For external use only. One-sixth of a grain of pure cyanide of potassium is equal to about one minim of the medicinal prussic acid of the Dublin Pharmacopœia.

INCOMPATIBLES.—All acids, and acidulous salts.

SPIRITUS PYROXILICUS, D. *Pyroxylic spirit; Medicinal Naphtha.* (*Hydrated Oxide of Methyl*).

PREPARATION.—An article of the *Materia Medica* in the Dublin Pharmacopœia. According to Dr. Ure of London it is prepared by uniting crude pyroligneous acid with lime, and then distilling the pyrolignite of lime which yields about one per cent. of crude spirit. The spirit is purified by repeated distillation from quick lime (Christison). But the mode of preparation of the liquid sold under the name of *medicinal naphtha* and used in medicine in the present day, is kept secret by the chemists who prepare it; there is no doubt, however, but that it is a product of the destructive distillation of wood.

PHYSICAL PROPERTIES.—A colourless, transparent, limpid fluid, with an agreeable, ethereal, alcoholic odour, bearing some resemblance to that of acetic ether, and an aromatic, not unpleasant taste. Specific gravity, ·846, D.

CHEMICAL PROPERTIES.—The chemical characters of medicinal naphtha are those of pyroxylic spirit, under which name it has been introduced into the last edition of the Dublin Pharmacopœia. It is miscible with water and alcohol in all proportions, an increased temperature being produced on its addition to the former. It is very volatile and boils at about 150° F., and is inflammable, burning with a pale blue flame. It is perfectly neutral to test paper.

Adulterations.—Ordinary naphtha is sometimes substituted for medicinal naphtha (pyroxylic spirit), but may be readily distinguished by the chemical characteristics given above.

THERAPEUTICAL EFFECTS.—This remedial agent was first intro-

duced into the practice of medicine by Dr. Hastings, who along with the late Dr. Hocken vaunted it as a perfect cure for pulmonary consumption. They both agreed in describing its effects on the system generally as those of a stimulant, and considered its curative action to depend on its possessing a solvent power over tubercle. Although few, if any, believe now that phthisis can be cured by this agent, it must be confessed that the results of the experience of nearly all who have tried its effects in this disease, is strongly confirmatory of its being a most useful remedy, and in this opinion I fully agree. It appears to me, however, to act as a direct sedative: the harassing cough and troublesome vomiting so frequent an attendant of the advanced stages of consumption, being more relieved by it than by any other remedy I have employed; and it is consequently in cases in which these symptoms are very prominent that it proves most beneficial.

DOSE AND MODE OF ADMINISTRATION.—Min. v. to min. xx. three or four times a day. It may be given in some aromatic water and sweetened with syrup if necessary. The following is the mixture which I ordinarily employ:—*Mistura Naphthæ Medicinalis*, (Medicinal naphtha, f3ij.; compound tincture of cardamoms, f3vj.; water, f3vij.; mix). Dose, f3ss. every fourth hour.

TABACUM, D. L. E. *Tobacco. Leaves (dried, L.) of Nicotiana tabacum.* A native of America belonging to the Natural family *Solanaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—A viscid, herbaceous annual; Stem 3-6 feet high, erect, branching at the top; Leaves, sessile, ovato-acuminate, very large, pale green; Flowers, in panicles, rose-coloured; Capsules, two-celled, loculicidal, containing many small somewhat reniform, brown seeds.

PREPARATION.—In the month of August the plants are cut off above their roots, and dried under sheds; when perfectly dry, the leaves are stripped off, twisted, tied in bundles, and packed with great compression into hogsheads for exportation. Virginia tobacco in leaf should be the kind employed for medical purposes.

PHYSICAL PROPERTIES.—Virginia tobacco leaves are of a dark brown colour with yellowish spots, and have an unctuous feel. Their odour is peculiarly heavy and narcotic; their taste bitter and nauseous.

CHEMICAL PROPERTIES.—Tobacco is composed of a peculiar, liquid, colourless, volatile alkaloid which has been named *nicotina*; of a concreted volatile oil, *nicotianin*; of bitter extractive, gum, chlorophylle, vegetable albumen, gluten, starch, malic acid, and some salts. Its properties depend on the alkaloid and the volatile oil; the former is heavier than water, is odourless when cold, but when heated has the odour of tobacco, and an acrid, burning taste, so intense as to communicate it perceptibly to 10,000 parts of water; the latter has also the odour of tobacco, its taste is bitter and aromatic, leaving an unpleasant sensation in the throat, it does not exist in

recent tobacco leaves, and therefore must be developed during the process of drying. By burning tobacco an *empyreumatic oil* is produced from the decomposition of some of its constituents; this is usually found in pipes, which have been used some time for smoking, it is a very active poison. Tobacco leaves yield their properties readily to boiling water, alcohol, and spirituous liquors.

The adulterations of tobacco are unimportant in relation to its medical employment.

THERAPEUTICAL EFFECTS.—Tobacco taken internally in large doses acts as a powerful narcotico-acrid poison; the most marked symptoms are nausea, fainting, great exhaustion, general relaxation both of the voluntary and involuntary muscles, extreme depression of the circulatory powers (marked by the feeble fluttering pulse, cold extremities, paleness of the face, &c.), convulsions, paralysis, and death. In very small doses it is said to act as a diuretic, and sometimes as a laxative. In full medicinal doses, it operates as a direct sedative of the vascular system, and also of the cerebral functions. It is principally used in medicine to relax the muscular fibres:—thus it is employed in the form of enema, in strangulated hernia, in stricture or obstruction of the bowels from other causes, in retention of urine from spasmodic stricture of the urethra, or from spasm of the neck of the bladder, in obstinate constipation, in severe colic, and in tetanus; in all of which diseases its beneficial effects depend on its relaxing influence over the muscular system. Tobacco was formerly employed as a diuretic in dropsy, and also as an anthelmintic, but in the present day it is rarely used for either purpose. As an external agent the infusion or decoction may be applied by means of compresses in any of the cases above enumerated in which its sedative action is indicated; and in America an ointment is used in chronic cutaneous diseases, especially those of the scalp, but its use requires very great caution, as it has in some instances produced fatal results; for the same reason although a certain application for the destruction of vermin, the infusion of tobacco is but seldom employed for that purpose.

DOSE AND MODE OF ADMINISTRATION.—The use of tobacco requires great caution, as, in order to produce a sedative influence, its poisonous effects must be partially induced. For the preparation of an enema of tobacco, formulæ are given in the three British Pharmacopœias, but in no instance should a larger quantity be used at first than from gr. xv. to gr. xx. infused in Oj. of boiling water, for cases are on record where so small a quantity as ʒj. and even ʒss. has proved fatal.—*Enema Tabaci*, D. L. E. (Tobacco, ʒj. (ʒj. L.; gr. xv. to ʒss. E.); boiling water, fʒviij. (Oj. L.); macerate (infuse in a close vessel, D.) for one hour (half an hour, E.), and strain).—*Vinum Tabaci*, E. (Tobacco, ʒj.; sherry, fʒxij.; digest for seven days; strain, express strongly the residuum, and filter the liquors). Sedative and diuretic, but rarely used; Dose, min. x. to min. xl.

In cases of poisoning with tobacco, if the poison have been swallowed, emetics should be immediately administered; and in all cases

the most powerful stimulants, both external and internal, should be employed. The vegetable astringents have been proposed as antidotes for tobacco, tannin forming an insoluble precipitate with *nicotina*.

ZINCI CYANIDUM. *Cyanide of Zinc.* (*Cyanuret of Zinc ; Hydrocyanate of protoxide of Zinc*).

PREPARATION.—Pass the vapour of prussic acid into distilled water in which is suspended recently prepared hydrated oxide of zinc, which is obtained by adding in excess, water of caustic potash to a solution of chloride of zinc.

PROPERTIES.—It is a solid white salt, inodorous and insipid; is composed of one equivalent of cyanogen, and one of zinc; and is insoluble in both water and alcohol.

THERAPEUTICAL EFFECTS.—This preparation has been proposed on the continent as a substitute for hydrocyanic acid or the cyanide of potassium. The dose is from gr. $\frac{1}{4}$ to gr. j., but its insolubility renders it an objectionable preparation. In Germany it has been employed as an *anthelmintic* for children.

CHAPTER XVIII.

SIALOGOGUES.

(Masticatories).

SIALOGOGUES are substances, which by a *local* stimulant action augment the secretion of saliva. By this definition we exclude the so called *remote* or *specific* sialogogues as the preparations of mercury, gold, &c., which generally produce an increased flow of saliva when their internal use has been continued for some time; but as their remediate powers do not depend merely on the increase of this secretion, it will, I think, be more practical to confine the term *sialogogue* to those agents which are employed as direct stimulants to the salivary glands. There are but few substances used in the present day in the practice of medicine for this purpose, and their application to the treatment of disease is very limited.

ARMORACIA, L. E. *Horse-radish*. The fresh root of *Cochlearia armoracia*. Indigenous; belonging to the Natural family *Cruciferae* (*Brassicaceae*, Lindley), and to the Linnæan class and order *Tetradynamia Siliculosa*.

BOTANICAL CHARACTERS.—Roots perennial, fleshy, white, running deep into the ground; Stems, about 2 feet high; Leaves large, much veined; Flowers, white.

PHYSICAL PROPERTIES.—When bruised or cut, the fresh root emits a very acrid penetrating odour; it has a very pungent taste. The acrimony of the roots is lost by drying, but they may be preserved fresh for a long time by keeping them packed in sand in a damp cellar.

CHEMICAL PROPERTIES.—The active principle of horse-radish is a very acrid volatile oil, which may be obtained by distillation. The root yields its acrimony to both boiling water and alcohol; but it is dissipated by boiling.

THERAPEUTICAL EFFECTS.—Horse-radish root is an excellent sialogogue, producing a copious secretion of saliva. It has been sometimes employed in paralysis of the tongue, but like the other remedies of this class, it has nearly fallen into disuse. (See, *General Stimulants*).

MEZEREON (described in the division *Diaphoretics*), has been

occasionally used as a masticatory in tooth-ache and in difficulty of deglutition from paralysis. A small piece of the bark should be frequently chewed and the saliva assiduously rejected.

PYRETHRUM, L. E. *Pellitory of Spain.* Root of *Anacyclus pyrethrum*, E.—of *Anthemis pyrethrum*, L. A native of Asia Minor, and of the central parts of Europe; belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnæan class and order *Syngenesia Superflua*.

BOTANICAL CHARACTERS.—Root fusiform; Stems, several, procumbent, somewhat branched, pubescent; Branches, one headed; Florets of the ray, white above, purplish beneath; of the disc yellow.

PHYSICAL PROPERTIES.—It is in short tapering pieces, from 3 to 4 inches in length and about the thickness of the little finger. The bark is thick and of a dark brown colour with black shining spots; the internal structure is dirty yellow with a radiated appearance. It is inodorous, but when chewed produces a peculiar pricking sensation on the tongue and lips.

CHEMICAL PROPERTIES.—According to Parisel's analysis, the acrimony of this root depends on an acrid resin *Pyrethrin*, of which it contains 3 per cent.; the other constituents are, inulin, gum, tannin, colouring matter, lignin, a trace of iron and silica, and some salts. It yields its virtues to alcohol and ether, but not to water.

THERAPEUTICAL EFFECTS.—Pellitory root is the most useful of this class of remedies, acting as a powerful local stimulant to the salivary glands, and causing a copious secretion of saliva. It is used for this purpose in tooth-ache, neuralgia of the face, rheumatism of the jaws and paralysis of the tongue; in the latter of which affections I have employed it with benefit. It has been also employed in relaxation of the uvula. From ʒss. to ʒj. of the root may be chewed frequently. A tincture prepared by macerating for 7 days one part of the powdered root in five parts of rectified spirit and one of water, is used by some dentists to relieve tooth-ache.

CHAPTER XIX.

GENERAL STIMULANTS.

(Excitants ; Incitants ; Hypersthenics).

IT is difficult to define what is understood in the practice of medicine by the term Stimulant, excitement of the vital energies is produced by such different means under different circumstances ; with no class of remedies, therefore, is it more necessary to bear in mind the truth of the axiom, that medicines act merely *relatively*. In general terms Stimulants may be defined to be, agents which produce a sudden but not permanent augmentation in the activity of the vital functions. Their effect is evidently produced by their operation on the circulatory and cerebro-spinal systems, both of which are excited to increased energy, and many of them act topically on the parts of the body to which they may be applied, giving rise to local hyperemia. In their mode of action when administered internally, General Stimulants resemble in some respects Tonics ; thus, immediately after their administration, a feeling of tone or increased power is produced, which, however, is not permanent, but is almost invariably followed by a corresponding depression of vital power ; their effects also are more immediate and more manifestly perceived by the senses than those of Tonics. Many of the remedies contained in this division are closely related to Narcotics, for example, alcohol and the ethers ; the secondary effect of both of which, particularly if given in large doses, is to produce sleep and coma ; this does not, however, appear to be, as with Narcotics, from any direct action on the nervous system, but rather to result from exhaustion of the previously over-excited vital energy. The great number of medicines contained in this class, and the material difference of their action in relation to the particular effects which they produce on the animal economy, preclude me from laying down any general rule as to their administration in disease. The peculiarities in their mode of operation will be more conveniently considered when treating of the therapeutical effects of each article.

ACIDUM ACETICUM CAMPHORATUM, D. E. *Camphorated acetic acid*. An officinal substitute for aromatic vinegar.

PREPARATION.—"Take of camphor, one ounce; rectified spirit, one fluid drachm; strong acetic acid, ten fluid ounces. Reduce the camphor to powder, by trituration with the spirit; then add the acid, and dissolve," D.—"Camphor, ʒss.; acetic acid, fʒviss.; pulverise the camphor with a little rectified spirit, and dissolve it in the acetic acid," E.

This preparation is only employed as an external stimulant, the vapour being applied to the nostrils in syncope, or to rouse the vital energy when depressed by any cause. It is exceedingly pungent and very volatile, and should therefore be kept in well stopped bottles.—*Aromatic Vinegar* of the shops is a solution of camphor, and the volatile oils of cloves, lavender, and rosemary in the strongest acetic acid; its odour is more agreeable than that of the officinal preparation.

ÆTHER ACETICUS. *Acetic ether.* Not employed in this country, but officinal in most of the continental pharmacopœias.

PREPARATION.—*Parisian Codex.* "Rectified spirit, 100 parts; concentrated acetic acid, 63 parts; strong sulphuric acid, 17 parts; mix, and distil over a sand bath, 125 parts; deprive this of any free acetic acid it may contain by means of carbonate of potash, set aside until it settles, pour off the clear liquor and distil 100 parts."

PHYSICAL PROPERTIES.—It is a colourless, transparent, very volatile liquid, with an agreeable, refreshing odour, and a warm ethereal taste, leaving a cooling impression on the palate. Specific gravity, .860.

CHEMICAL PROPERTIES.—According to the recent chemical theories as to the constitution of the ethers, acetic ether is an *acetate of oxide of ethyl*, its composition is $C^8 H^8 O^4$, or $C^4 H^5 O + C^4 H^3 O^3$; it boils at 165° . It is soluble in 7 parts of water, and in alcohol and ether in all proportions. Acetic ether, when free from water, may be kept unchanged in stoppered bottles, but if it contains water, it is rapidly converted into acetic acid and alcohol; the alkalies decompose it with great facility.

THERAPEUTICAL EFFECTS.—Acetic ether is an agreeable but mild general stimulant, at one time much used on the continent in hysteria and nervous affections; at present it is chiefly employed externally as an ingredient in stimulating liniments.—*Camphorated Acetic Liniment*, PELLETIER. (Soap, and camphor, of each, ʒij.; acetic ether, fʒij.; dissolve in a water bath, and add oil of origanum, min. xx). An excellent stimulating liniment in rheumatic and arthritic pains, and in sciatica.

ÆTHER SULPHURICUS, D. L. E. *Sulphuric ether. Ether. Oxide of ethyl.*

PREPARATION.—*Dublin.*—"Take of rectified spirit, three pints; oil of vitriol of commerce, eight fluid ounces; fresh burned lime, in fine powder, one ounce. Mix the acid and ten ounces of the spirit in a glass matrass, capable of holding a quart at least, and, without allowing the mixture to cool, connect the matrass with a Liebig's condenser, and, applying a sufficient heat to maintain the liquid in brisk ebullition, commence the distillation. As it proceeds, admit gradually, through a glass tube traversing the cork of the matrass, the remainder of the spirit, regulating its influx so that the boiling liquid shall maintain a constant level; and, when the entire of it has been introduced, continue the application of the heat until the contents of the matrass become black, and show a tendency to froth over. (The tube through which the spirit enters should dip by its lower extremity, where its diameter is contracted, at least half an inch beneath the surface of the liquid in the matrass; and the eduction pipe of the reservoir for the spirit, with which the exterior extremity of the glass tube is connected, should be furnished with a stop-cock, to regulate the descent of the spirit. This reservoir also should be placed at least three feet above the level of the boiling liquid). The crude ether thus obtained is to be agitated with the pulverized quick lime, and then rectified, the distillation being continued as long as the product, on being well shaken, continues to have a specific gravity lower than 750. The resulting liquid should be preserved in a cool place in accurately stopped bottles. A fresh reservoir being attached to the further end of the condenser, and the distillation resumed, a product will be obtained which may be substituted for rectified spirit in a subsequent ether process." *London.*—"Take of rectified spirit, ℔ij.; sulphuric acid, ℔ij.; carbonate of potash previously ignited, ʒj.; pour ℔ij. of the spirit into a glass retort, add the acid to it and mix. Afterwards place it on sand, and raise the heat so that the liquor may quickly boil, and the ether pass into a receiving vessel cooled with ice or water; let the liquor distil until some heavier portion begins to pass over. To the liquor which remains in the retort after the heat has subsided, pour the remainder of the spirit that ether may distil in the same manner; mix the distilled liquors, then pour off the supernatant portion, and add to it the carbonate of potash, shaking them frequently during an hour. Lastly, let the ether distil from a large retort, and be kept in a stopped vessel." *Edinburgh.*—"Take of sulphuric acid, f℥x.; rectified spirit, f℥l.; pour f℥xij. of the spirit gently over the acid in an open vessel, and then stir them briskly and thoroughly; transfer the mixture immediately into a glass matrass connected with a refrigeratory, and raise the heat quickly to about 280°. As soon as the ethereal fluid begins to pass over, supply fresh spirit through a tube into the matrass in a continuous stream, and in such quantity as to equal the volume of the fluid which distils over. This is best done by connecting one end of the tube with a graduated vessel containing the spirit, passing the other end through a cork fitted into the matrass, and having a stop-cock on the tube to regulate the discharge. When the whole spirit has been added, and f℥xlj. have distilled over, the process may be stopped; agitate the impure ether with f℥xvj. of saturated solution of muriate of lime, containing also ʒss. of lime recently slaked. When all odour of sulphurous acid has disappeared, pour off the supernatant liquid and distil it with a gentle heat so long as what passes over has a density not higher than 735. More ether of equal strength may be obtained from the muriate of lime; and from the residuum of each distillation a weaker ether may be obtained in small quantity, which must be rectified by distilling it gently again."

PHYSICAL PROPERTIES.—Ether is a transparent, colourless, very mobile liquid, with a fragrant penetrating odour, and a pungent aromatic taste, leaving a sense of coldness on the tongue and palate. The specific gravity of the Dublin and London preparation is .750.

CHEMICAL PROPERTIES.—Its composition is C^4H^5O or EO , being an oxide of *ethyl*. It is extremely volatile; it boils between 96° and 98°; is highly combustible, burning with a white flame and the formation of carbonic acid and water. Great cold is produced by its evaporation. When recently prepared, ether is perfectly neutral, but soon becomes acid by keeping. One part of ether dissolves in 10 parts of water, while 36 parts of ether dissolve 1 of water; it com-

bines in all proportions with alcohol. It dissolves most resins, the volatile oils, and many of the vegetable alkaloids.

Adulterations.—Ether frequently contains water and alcohol; from bad keeping, acetic acid also is often present. The latter may be detected by the effect on litmus paper, and water by the density being higher than that indicated by the colleges. The presence of alcohol, as well as the quantity if it be present, is satisfactorily ascertained by the test of the *Edinburgh Pharmacopœia*:—"When agitated in a minim measure with half its volume of concentrated solution of muriate of lime, its volume is not lessened." If the solution of ether in water be not perfectly transparent, the presence of ethereal oil may be suspected.

THERAPEUTICAL EFFECTS.—The action of sulphuric ether when taken internally is that of a general diffusible stimulant; its effects, which are rapidly produced, are equally transient. In very large doses it is a narcotic poison, producing death with symptoms similar to those caused by alcohol. Applied externally, its action is refrigerant owing to the cold produced by its immediate evaporation. As a stimulant, ether is chiefly employed in spasmodic and nervous affections unaccompanied by inflammation; thus, it is employed with benefit in cramp of the stomach, in spasmodic or flatulent colic, in nervous palpitations, in hiccup, in nervous head-ache, during a paroxysm of spasmodic asthma, &c. It is also administered frequently with good effect in the advanced stages of fever when subsultus tendinum and hiccup are present; and as an immediate stimulant in fainting and asphyxia. In the employment of ether as a stimulant, the transient nature of its operation should be borne in mind, and consequently that the doses require to be repeated at short intervals. The influence of ether over the system is much diminished by habit, therefore it should be administered to those who are accustomed to its use in much larger doses. The effects of the vapour of ether when inhaled, have already been adverted to (page 250), but its use is now nearly universally supplied by chloroform; in some parts of America, however, it still holds its ground, and many of the United States physicians and surgeons employ a mixture of two parts of ether and one of chloroform to produce anæsthesia. Externally, ether has been applied with friction as a local stimulant in rheumatic and neuralgic pains. In pharmacy it is employed to extract the active principles of many medicines.

DOSE AND MODE OF ADMINISTRATION.—℥ss. to ℥ij.; it is usually administered in some aromatic water. "Ether may be readily incorporated with water or any aqueous vehicle by rubbing it up with spermaceti, employed in the proportion of gr. ij. for each fluid drachm of the ether," (*United States Dispensatory*). The vapour of ether differing from chloroform in being of very light specific gravity, requires for its inhalation that the patient should be in the erect position, and in consequence of its volatility that an apparatus or ether inhaler, of which many forms have been proposed, should be employed for its administration.—*Spiritus*

Ætheris Sulphurici, E. (Sulphuric ether, Oj.; rectified spirit, Oij.; mix them together. Density, 809; it does not affect litmus paper, or render water muddy; when agitated with twice its volume of concentrated solution of muriate of lime, 28 per cent. of ether separate by rest). Uses and properties similar to those of ether. Dose, fʒj. to fʒiij. It is miscible with water in all proportions.—*Oleum Æthereum*, L. (Rectified spirit, ℥ij.; sulphuric acid, ℥iv.; solution of potash; and distilled water, of each, fʒj. or as much as may be sufficient; mix the acid cautiously with the spirit. Let the liquor distil until a black froth arises, then immediately remove the retort from the fire, separate the lighter supernatant liquor from the heavier one, and expose the former to the air for a day; add to it the solution of potash first mixed with water, and shake them together. Lastly, when sufficiently washed, separate the ethereal oil which subsides). This preparation is only employed as an ingredient in the following compound:—*Spiritus Ætheris Sulphurici compositus*, L. (Sulphuric ether, fʒviiij.; rectified spirit, fʒxvj.; ethereal oil, fʒiij.; mix).—*Spiritus Æthereus Oleosus*, D. (Take of rectified spirit, one pint and a half; oil of vitriol of commerce, one pint and a half; sulphuric ether, five fluid ounces. Mix the oil of vitriol with one pint of the rectified spirit, in a matrass of glass, and, connecting this with a Liebig's condenser, apply heat, and distil, till a black froth begins to rise. Separate the uppermost or lighter stratum of the distilled liquid, and, having exposed it in a capsule for twenty-four hours to the atmosphere, let the residual oil be transferred to a moist paper filter, and washed with a little cold water, so as to remove any adhering acid. Let it now be introduced into a bottle containing the remainder of the spirit mixed with the ether, and dissolved). Commonly known as *Hoffman's anodyne liquor*; it is used in nearly the same cases as sulphuric ether, but its properties are more decidedly anti-spasmodic; the dose is fʒss. to fʒij. It is miscible with water in all proportions. This preparation is often prescribed in combination with laudanum, the disagreeable subsequent effects of which it is said to prevent.

In cases of poisoning with ether, the stomach pump should immediately be had recourse to; cold affusion, and the most powerful internal and external stimulants assiduously employed; in extreme cases, artificial respiration should be effected.

ALCOHOL, D. L. E. *Absolute alcohol of the density 795*, D.—794-6, E.—*Alcohol with a small proportion of water, density 815*, L.

PREPARATION.—*Dublin*.—"Take of stronger spirit, one pint; pulverized fresh burned lime, ten ounces: having introduced the lime and spirit into a matrass, connected in the usual manner with a Liebig's condenser, let heat be applied until the lime begins to slake, and, when this process is completed, distil by means of a chloride of zinc bath until the liquid which comes over, together, with that obtained during the slaking, measures two ounces. This being rejected, the receiver should be changed, and the distillation resumed, and continued until a product of nearly sixteen ounces is procured. The specific gravity of this product is 795." *London*.—"Rectified spirit, cong. j.;

chloride of calcium, lbj. ; put the chloride of calcium into the spirit, and when it is dissolved, let Ovij. f3v. distil." *Edinburgh*.—"Rectified spirit, Oj. ; lime, 3xviij. ; break down the lime into small fragments, expose the spirit and lime together to a gentle heat in a glass matrass till the lime begins to slake ; withdraw the heat till the slaking be finished, preserving the upper part of the matrass cool with damp cloths ; then attach a proper refrigeratory, and with a gradually increasing heat distil off f3xviij. The density of this alcohol should not exceed 796 ; if higher, the distillation must have been begun before the slaking of the lime was altogether finished." SPIRITUS FORTIOR, D.—The following formula for *Stronger spirit* directed by the Dublin College to be used in the preparation of alcohol is given in their last pharmacopœia :—"Take of rectified spirit, half a gallon ; carbonate of potash from pearl-ash, eight ounces : having dried the carbonate of potash at a low red heat, and rapidly reduced it to powder in a warm mortar, let it be shaken occasionally for four hours in a bottle with the spirit, maintaining the temperature of the mixture at or about 100°. After a subsidence of twenty minutes' duration, the liquid will form two distinct strata, the uppermost of which (measuring about seventy-four ounces) should be separated by decantation or a syphon, and then distilled with the aid of a Liebig's condenser, and chloride of zinc bath, until the product amounts to seventy-two ounces. The specific gravity of this spirit is 818."

PHYSICAL PROPERTIES.—Alcohol is a transparent, colourless liquid, with a pungent, rather agreeable odour, and an acrid burning taste. Its density varies with the quantity of water it contains ; that of the spirit of the pharmacopœias has been given above. RECTIFIED SPIRIT, (*Spiritus rectificatus*, D. L. E.) is an article of the *Materia Medica* ; the Dublin College fixes its specific gravity at .840 ; the London College at .838 at 62° F. ; and the Edinburgh College at .838, at 60° F.—PROOF SPIRIT (*Spiritus tenuior*, D. L. E.) is directed by the Dublin College to be prepared as follows :—"Take of rectified spirit, seven pints ; distilled water, four pints : mix. The specific gravity of proof spirit is 920." In the London and Edinburgh pharmacopœias it is an article of the *Materia Medica*, but as met with in commerce, it is unfit for medical use in consequence of its containing essential oil ; these Colleges have, therefore, directed it to be prepared "by mixing together Ov. (Ovj. E.) of rectified spirit, with Oij. of distilled water, at a temperature of 60° (62°, L.)." Its specific gravity according to the laws of the kingdom, is .920° at 60° F. ; and it is obtained of this strength by the directions of the Dublin and London Colleges ; the Edinburgh fixes it at .912, at 60° F.

CHEMICAL PROPERTIES.—Absolute alcohol is a *Hydrated oxide of ethyl* ; its composition is $C^4 H^5 O + HO$, or $EO + HO$. It boils at 173° ; it is very volatile, and is highly inflammable, burning with a pale blue flame, free from smoke, water and carbonic acid being the products of its combustion ; it has never been frozen. It attracts water from the air and therefore becomes weak if kept in an imperfectly closed vessel ; it is miscible with water in all proportions, a disengagement of heat, a diminution of bulk, and an increase of density accompanying their union. Alcohol dissolves the caustic alkalis and alkaline sulphurets ; it also dissolves all the deliquescent inorganic salts, except carbonate of potash, but none of the salts which are insoluble or sparingly soluble in water, nor efflorescent salts. It likewise dissolves many vegetable substances, as all essential and most fixed oils, the vegetable alkaloids, sugar, resins, extractive,

&c., for many of which purposes it is employed in pharmacy. Alcohol prevents the putrefaction of animal substances which are immersed in it, and hence its employment in the preservation of anatomical preparations. *Rectified* and *Proof spirit* have similar properties to alcohol, their taste is milder, their boiling point higher according to the state of dilution, their inflammability less, and the colour of the flame with which they burn deeper yellow the more water they contain. *Proof spirit* is defined by law to be such that at the temperature of 51° F., 13 volumes of it weigh exactly as much as 12 volumes of water; 100 parts of spirit of this strength consist of 49 parts by weight of absolute alcohol, and 51 parts by weight of distilled water at 60° F.

Adulterations.—The specific gravity is a sufficient test of the strength of alcohol and the weaker spirits, but in ascertaining their density, the temperature should at the same time be carefully noted, for the lower the temperature, the greater will be the density of the spirit. The rectified spirit of British commerce frequently contains *oil of grain*, a contamination derived from the corn during the process of distillation. Its presence is readily detected by the test of the *Edinburgh Pharmacopœia*, “f3iv. treated with 25 minims of solution of nitrate of silver (gr. j. to gr. xl. of water), exposed to bright light for 24 hours, and then passed through a filter purified by weak nitric acid, so as to separate the black powder which forms, undergo no farther change when again exposed to light with more of the test.” The same test is applicable to both alcohol and proof spirit.

THERAPEUTICAL EFFECTS.—Alcohol is the intoxicating principle of all spirituous liquors; in moderate doses properly diluted it acts as a general stimulant, exciting particularly the vascular and nervous systems; in somewhat larger doses it produces the well known effects of intoxication; and in excessive doses it acts as a powerful narcotic poison, rapidly causing death, preceded by slow pulse, contracted pupils, and coma. This effect is most usually observed when a large quantity of ardent spirits has been drank at once. As a stimulant, alcohol is employed in medicine to support the vital powers in the advanced stages of fevers, particularly those of a typhoid character; for this purpose brandy or whiskey is usually employed, but wine is generally preferred, (see *Vinum*). It is also often used in flatulent colic, in indigestion, in vomiting, and in fainting. As an external stimulant, it is a common ingredient in lotions, for sprains and bruises, for many forms of external inflammations—as erysipelas and erythema, for various skin diseases, to prevent excoriations in parts exposed to prolonged pressure, and with friction over the region of the heart in syncope and suspended animation. Diluted with six parts *by measure* of water, it has been used as an injection after tapping for the radical cure of *hydrocele*. In consequence of its producing cold by evaporation, alcohol is frequently added to cooling and evaporating lotions.

DOSE AND MODE OF ADMINISTRATION.—In fevers, brandy or whiskey is given in the form of punch; the quantity which should

be given depends so much on the circumstances of each particular case, that it would be impossible to lay down here any general rule on the subject. In the fever which proved so fatal to the British Legion in Spain in the year 1835, Dr. Lardner frequently gave so much as 32 ounces of brandy in the 24 hours.—*Mistura spiritus vini gallici*, L. (Brandy; cinnamon water, each, f̄3iv.; the yolks of two eggs; purified sugar, 3ss.; oil of cinnamon, min. ij.; mix). An agreeable and excellent stimulant in doses of f̄3ss. to f̄3iss.

In poisoning with ardent spirits, the contents of the stomach should be immediately evacuated by means of the stomach-pump, and external stimulants, especially the cold affusion, assiduously employed. The coma of ordinary intoxication is best treated by the internal use of ammonia, or of the solution of the acetate of ammonia; if apoplectic symptoms be present, cold lotions to the head, the application of leeches to the temples, and warmth to the extremities, will be found most useful.

AMMONIACUM, D. L. E. *Gum-ammoniac*. *Gum resinous exudation of Dorema ammoniacum*. The plant indicated above, which is the true source of this drug as met with in commerce, is a native of Persia; but the ammoniacum of the ancients was procured from the *Ferula orientalis*, a native of Morocco, in which country it is obtained from it even in this day. They both belong to the Natural family *Umbelliferae* (*Apiaceae*, Lindley), and to the Linnæan class and order *Pentandria Digynia*.

BOTANICAL CHARACTERS.—A glaucous-green plant, 4-7 feet high; Stem about 4 inches in diameter, branching; Leaves, large, 2 feet long, on downy petioles, sheathing at the base; Flowers, white, in proliferous, racemose umbels.

PREPARATION.—The gummy juice which pervades the whole plant oozes forth on the slightest puncture. During the warm season, the branches and stem are attacked by innumerable beetles, by which it is pierced in all directions; through these punctures the juice exudes, and soon concretes into a hard gum, when it is picked off by the country people.

PHYSICAL PROPERTIES.—Ammoniac is met with in various sized roundish tears, or in masses composed of the tears agglutinated together. They are of a yellowish or reddish-yellow colour externally, internally they are white and shining like enamel, hard and brittle, and vary in size from that of a small pea to that of a walnut. The odour is peculiar, faintly nauseous, more powerful when heated; the taste is bitter and disagreeable.

CHEMICAL PROPERTIES.—Ammoniac is a gum-resin containing about 80 per cent. of resin, and about 18 per cent. of gum, with a trace of volatile oil. It is softened by exposure to heat, is inflammable and burns with a white flame. It does not dissolve in water, but is miscible with it forming a milky emulsion, the gum which is soluble suspending the resin in the mixture. It is soluble in both ether and alcohol.

THERAPEUTICAL EFFECTS.—Ammoniac is a general stimulant of but little power; its effects were at one time generally believed to be chiefly manifested on the respiratory organs, and consequently it was classed amongst expectorants, and employed in chronic bronchitis; but any benefit that may have resulted from its use as such, must have depended on its general stimulant properties; by many practitioners it is still highly prized as a stimulant expectorant. It possesses some antispasmodic powers, but is much inferior as such to the other fetid gum-resins. In the present day it is chiefly employed, as an external stimulant in the form of plaster, to scrofulous tumours, chronic enlargement of the joints, indolent glandular swellings, &c., in which it often proves useful.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒss. in pills or made into an emulsion with milk or water.—*Mistura Ammoniaci*, D. L. (“Take of gum ammoniac, two drachms; water eight ounces; triturate the gum with the water gradually added, until the mixture assumes the appearance of milk; then strain through muslin,” D.—“Ammoniacum, ʒv.; water, Oj.; rub the ammoniacum with the water gradually poured in, until they are perfectly mixed,” L.). This mixture has a milky appearance, the resin being suspended in the water by means of the gum. It was formerly commonly employed as the basis of expectorant mixtures in chronic chest affections. Dose, fʒss. to fʒj.—*Emplastrum Ammoniaci*, D. L. E. (“Take of gum ammoniac, in coarse powder, four ounces; proof spirit, four fluid ounces: dissolve the gum ammoniac in the spirit, with the aid of heat, and strain; then evaporate the solution by means of a steam or water bath, stirring constantly until it acquires a proper consistence,” D.—“Ammoniacum, ʒv.; distilled vinegar, fʒviij. (fʒix., E.); dissolve the ammoniacum in the vinegar; then evaporate the liquor with a slow fire (over the vapour-bath, E.), constantly stirring, to a proper consistence,” L. E.).—*Emplastrum Gummosum*, E. (Litharge plaster, ʒiv.; ammoniac; galbanum; and bees’ wax, of each, ʒss.; melt the gum-resins together, and strain them, melt also together the plaster and wax, add the former to the latter mixture, and mix the whole thoroughly). These plasters should be spread on leather for application; when left on for some time, they often produce an eruption of small pimples.

AMMONIÆ LIQUOR, D. L. AMMONIÆ AQUA, E. *Diluted aqueous solution of ammonia* (described in the division *Antacids*), is a general stimulant, prompt, but temporary in its action. It is principally used in typhus fever where there is great deficiency of nervous power; in the advanced stages of continued fever when all inflammatory action has subsided; in the cold stage of intermittents; in the eruptive fevers where the eruption has receded from the skin, and in the latter stages of pneumonia if there be much depression of the vital powers. Owing to its stimulant operation, ammonia is also found

useful in spasmodic affections which depend on the increased irritability that accompanies depression of the nervous system, as in hiccup, in subsultus tendinum, in the nervousness caused by excessive smoking or the use of intoxicating liquors, and in some forms of hysteria and of asthma. It is the best internal stimulant that can be employed in the coma of intoxication, and in poisoning with *sedatives*. As an external stimulant, the vapour of ammonia is inhaled in syncope, and in asphyxia. Solution of ammonia may be given as a stimulant in the same doses as directed in the division *Antacids*; but it should be given repeatedly, and at shorter intervals.

AMMONIÆ SESQUICARBONAS, D. L. AMMONIÆ CARBONAS, E. *Sesqui-carbonate of ammonia* (described in the division *Antacids*), is employed as a stimulant in the same cases as the aqueous solution of ammonia, to which it is usually preferred. The chief advantage that ammonia and the sesqui-carbonate possess as stimulants in febrile diseases is, that they rouse the energies of the system without producing that disturbance of the brain which is liable to result from the use of vinous liquors. Dose, gr. v. to gr. xv. dissolved in camphor mixture, or any simple vehicle, every 4 or 5 hours. It should not be administered in the solid state, from its liability to produce vomiting when thus given.

AMMONIÆ HYDROSULPHURETUM, D. *Hydrosulphuret of ammonia*. *Hydrosulphate of ammonia*.

PREPARATION.—“Take of solution of ammonia, four fluid ounces; sulphuret of iron, one ounce and a half; oil of vitrol of commerce, one fluid ounce and a half; water, fifteen ounces; distilled water, two ounces: place the sulphuret of iron and water in a two-necked bottle, and, adding the oil of vitriol by degrees through a safety funnel, conduct by suitable tubes the sulphuretted hydrogen which is disengaged, first through the distilled water placed in a small intermediate phial, and then to the bottom of a bottle containing the ammonia, the neck of the latter, through which the glass tube conveying the gas passes, being loosely plugged with tow. If, when the development of gas has ceased, a drop of the ammoniacal liquid added to a saturated solution of sulphate of magnesia gives no precipitate, the preparation is completed; but should a precipitate occur, the hydro-sulphuret still contains free ammonia, and must therefore be again subjected to the action of a stream of sulphuretted hydrogen. The hydro-sulphuret of ammonia must be kept in a green glass bottle, furnished with an accurately ground stopper. The specific gravity of this solution is 999.”

PROPERTIES.—A greenish-yellow, very fetid liquid, emitting an odour of sulphuretted-hydrogen gas, having an acrid, very disagreeable taste. It is a solution of the neutral hydrosulphate of ammonia in water. Exposed to the air it deposits sulphur owing to the escape of some of the ammonia; and on the addition of any of the mineral acids, sulphuretted-hydrogen gas is evolved.

THERAPEUTICAL EFFECTS.—This preparation has nearly fallen into disuse. It was formerly employed with the idea of de-oxygenising

the system in diabetes, as also of diminishing the morbid appetite of that disease. It possesses some slight stimulant properties, and although it has been retained in the last edition of the Dublin pharmacopœia, it might well be spared from the list of medicinal agents. The dose is from min. iv. to min. vj. in one or two fluid ounces of some distilled or aromatic water.

AMMONIÆ MURIAS, D. E. AMMONIÆ HYDROCHLORAS, L. *Muriate of ammonia. Hydrochlorate of ammonia. Chloride of ammonium. Sal-ammoniac.*

PREPARATION.—An article of the *Materia Medica*. It is procured by the manufacturers on the large scale, by decomposing the sulphate of ammonia which is formed in the manufacture of coal gas, or from the carbonate of ammonia obtained by the distillation of bones. In either case, the decomposing agent employed is common salt (chloride of sodium).

PHYSICAL PROPERTIES.—This salt generally occurs in large crystalline cakes, convex on one side, concave on the other, of a greyish-white colour, semi-transparent. It is tenacious, and difficult to reduce to powder; inodorous, with a pungent, acrid, bitter taste. Specific gravity, 1.45.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of chlorine, 2 of hydrogen, and 1 of amidogene, its formula being Cl , 2 H , NH^2 , (Kane). It is permanent in the air; exposed to heat it sublimes unchanged. It is soluble in 2.72 parts of water at 60° , and in its own weight of boiling water; it is also soluble in alcohol. During its solution in water, a great degree of cold is produced. This salt is best characterised by the evolution of gaseous ammonia, which takes place when it is rubbed in a mortar with quicklime.

THERAPEUTICAL EFFECTS.—Hydrochlorate of ammonia is not much employed in this country as an internal remedy; but on the continent, especially in France and Germany, it bears a high character as a stimulant in mucous fevers as soon as the acute inflammatory symptoms have subsided, in the slighter cases of inflammations of the serous membranes, in the milder forms of pneumonia and of hooping cough, in mucous diarrhœa, in chronic rheumatism and gout, and in passive dropsies. I have found it useful in some cases of adynamic fever, and the subacute forms of laryngitis. M. Cless has employed it extensively in the early stages of tubercular phthisis, and he states with the most decidedly beneficial results. As a topical remedy muriate of ammonia is very generally employed as an ingredient in discutient lotions, and in consequence of the cold produced during its solution in water, as an external refrigerant.

DOSE AND MODE OF ADMINISTRATION.—Internally, gr. v. to gr. xxx. combined with some aromatic powder, in the form of pill or of bolus, or dissolved in some aromatic water. For external use it may be dissolved in water, or in vinegar in the proportion of from ʒij. to ʒss. of the salt in a pint of liquid, to which rectified spirit is generally

added. A refrigeratory mixture may be prepared, by dissolving 5 parts each of this salt and of nitre in 16 parts of water, which will reduce the temperature forty degrees.

INCOMPATIBLES.—Sulphuric and nitric acids; potash, soda, lime, magnesia, and their carbonates; and most metallic salts.

If an overdose of this salt has been taken, vomiting should be promoted by the use of tepid mucilaginous and demulcent drinks.

AMMONIÆ SPIRITUS, L. E. *Spirit of Ammonia. Solution of carbonate of ammonia (of ammonia, E.) in rectified spirit.*

PREPARATION.—*London*.—"Hydrochlorate of ammonia, ℥x.; carbonate of potash, ℥xvj.; rectified spirit; and water, of each, Oijj.; mix, and let Oij. distil." *Edinburgh*.—"Rectified spirit, Oij.; fresh burnt lime, ℥xij.; muriate of ammonia in very fine powder, ℥viij.; water, f℥viss.; let the lime be slaked with the water in an iron or earthen vessel, and cover the vessel till the powder be cold; mix the lime and muriate of ammonia quickly and thoroughly in a mortar, and transfer the mixture at once into a glass retort; adapt to the retort a tube which passes nearly to the bottom of a bottle containing the rectified spirit; heat the retort in a sand-bath gradually, so long as any thing passes over, preserving the bottle cool. The bottle should be large enough to contain one-half more than the spirit used."

PROPERTIES.—This preparation, which has been omitted from the last edition of the Dublin pharmacopœia, is a transparent, colourless liquid, with a pungent ammoniacal odour, and an acrid taste. It is very volatile, and acts as an alkali on vegetable colours. The London preparation effervesces with the stronger acids. Specific gravity, .860, L.

THERAPEUTICAL EFFECTS.—Spirit of ammonia is a stimulant of some power, and may be used as such in the same cases as the aqueous solution of the gas, or of the sesquicarbonate. Dose, f℥ss. to f℥iiss. in some aromatic water, or in camphor mixture. It is generally employed in the following form:—*Spiritus Ammoniac aromaticus*, D. L. E. ("Take of rectified spirit, three pints; stronger solution of ammonia, six fluid ounces; oil of lemon, half a fluid ounce; oil of nutmeg, two fluid drachms; oil of cinnamon, half a fluid drachm: dissolve the oils in the spirit, and add the solution of ammonia; mix with agitation and filter. The specific gravity of this solution is 852," D.—"Hydrochlorate of ammonia, ℥v.; carbonate of potash, ℥viij.; cinnamon, bruised; and cloves bruised; of each, ℥ij.; lemon peel, ℥iv.; rectified spirit; and water, of each, Oiv.; mix, and distil, Ovj." L.—"Spirit of ammonia, f℥viij.; volatile oil of lemons, f℥j.; volatile oil of rosemary, f℥iiss.; dissolve the oils in the spirit by agitation," E.). An excellent and agreeable stimulant in fainting, hysteria, nervous debility, and flatulent colic. Dose, min. xxx. to f℥j. in distilled water, or in camphor mixture.—*Tinctura Ammoniac composita*, L. (Mastich, ℥ij.; rectified spirit, f℥ix.; oil of lavender, min. xiv.; oil of amber, min. iv.; stronger solution of ammonia, Oj.; macerate the mastich in the spirit that it may be dissolved, and pour

off the clear tincture; then add the other ingredients, and shake them all together). A powerful stimulant, chiefly used in hysteria. Dose, min. v. to min. x. in water.

ANETHUM, L. E. *Dill*.—*Fruit of Anethum graveolens*. A native of the South of Europe; belonging to the Natural family *Umbelliferae* (*Apiaceae*, Lindley), and to the Linnæan class and order *Pentandria Digynia*.

BOTANICAL CHARACTERS.—An annual, 1-2 feet high; Stem, striated; Leaves, decomposed, with fine capillary segments; Flowers, yellow.

PROPERTIES.—The fruit, commonly called *dill-seed*, is elliptical, flat, of a brownish colour, with a lighter coloured, thin, membranous margin. The odour resembles caraway; the taste is pungent, somewhat bitter. It contains about 3 per cent. of a light yellow, volatile oil, on which its properties depend.

THERAPEUTICAL EFFECTS.—An aromatic stimulant, sometimes used in the flatulent colic of children, and in the form of dill water as a vehicle for other remedies, chiefly purgatives, the griping properties of which it corrects.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to ʒj. of the bruised fruit for adults.—*Oleum Anethi*, E. (Prepared according to the general directions for the preparation of volatile oils). Dose, min. j. to min. v. rubbed up with sugar.—*Aqua Anethi*, L. E. (Dill, bruised, lbiss. (ʒxviij., E.); proof (rectified, E.) spirit, fʒviij. (fʒiiij, E.); water, cong. ij.; let a gallon distil). Dose, fʒss. to fʒiiij.

ANGELICA, E. *Root of Angelica archangelica*. Indigenous, but very rare; belonging to the Natural family *Umbelliferae* (*Apiaceae*, Lindley), and to the Linnæan class and order *Pentandria Digynia*.

BOTANICAL CHARACTERS.—Biennial, 4-5 feet high; Stem, 1-2 inches thick, fistulose; Leaves, bipinnate; Flowers, greenish-white.

PROPERTIES.—The root is imported from Hamburgh; it consists of numerous branches of the thickness of the little finger, proceeding from a short spindle-shaped root-stalk, grayish-brown externally, whitish within. The odour is aromatic and agreeable; the taste warm, aromatic and pungent. The fruit, commonly called *angelica seed*, is oval, obtuse, 1-2 lines long, of a yellowish brown colour, flat, longitudinally striated on one side, convex on the other; it has the odour and taste of the root. The medicinal properties of both root and fruit depend on a volatile oil, which may be obtained by distillation; a peculiar crystalline acid has been also found to exist in it, which has been named *angelicic acid*. The root contains also bitter extractive, and a bitter resin.

Adulterations.—On the Continent an adulteration of angelica root with the root of the *Ligusticum levisticum* (Lovage), has been indicated; it may be readily detected by its yellow coloured pith when cut transversely, that of angelica root being white.

THERAPEUTICAL EFFECTS.—An aromatic stimulant and carminative not much used. Dose of the *powdered root*, gr. x. to 3ss.; of the *bruised fruit*, 3ss. to 3j.

ANISUM, D. L. E. *Anise. Fruit (Seeds, D.) of Pimpinella anisum.* A native of Egypt and the Levant, extensively cultivated in various parts of Europe; it belongs to the Natural family *Umbelliferae* (*Apiaceae*, Lindley), and to the Linnæan class and order *Pentandria Digynia*.

BOTANICAL CHARACTERS.—Annual, about a foot high; Stem, smooth, erect, branching; Leaves of the stem, decomposed; Flowers, small, white, in terminal umbels.

PROPERTIES.—The fruit, (incorrectly described as the seed in the Dublin Pharmacopœia), commonly called *aniseed*, is ovoid, composed of two mericarps, with five primary ridges, slightly hairy, of a yellowish-brown colour; it has a peculiar, sweet, aromatic odour, and a warm, sweetish taste. Its properties depend on a volatile oil, of which it contains 3 per cent.; this oil is transparent and nearly colourless, having a slight greenish-yellow tinge; it congeals at 50° F., and does not become fluid again under 62°. Its specific gravity is .980; and it has the odour and taste of the fruit.

Adulterations.—The oil of star-anise (*Illicium anisatum*), which resembles oil of anise in odour and appearance, is often sold for it; the fraud is one of little consequence, but may be readily detected, as star-anise oil retains its fluidity at 35° F. The fruit of the hemlock has been confounded with *aniseed*, in consequence of which fatal accidents have in more than one instance occurred; they may be distinguished by the odour, and by the elevated ridges of anise fruit being smooth at the margin, not crenulate.

THERAPEUTICAL EFFECTS.—Anise is an aromatic stimulant and carminative; and as such is employed in flatulent colic, and in the diarrhœa of infants and children. It is said to promote the secretion of milk in nurses. It is much used on the Continent to flavour liqueurs.

DOSE AND MODE OF ADMINISTRATION.—Of the bruised fruit, gr. x. to 3ss.—*Oleum Anisi*, D. L. E. (Prepared according to the general directions for distilling volatile oils, see page 176). This oil is generally imported from Germany and the East Indies. Dose, min. ij. to min. viij. rubbed up with sugar.—*Essentia Anisi*, D., (Take of oil of anise, one fluid ounce; rectified spirit, nine fluid ounces. Mix with agitation). Dose, min. xx. to min. xl.—*Spiritus Anisi*, L. (Anise, bruised, 3x.; proof spirit, cong. j.; water, Oij.; mix, and with a slow fire distil a gallon). Dose, from f3ss. to f3j.—*Aqua*

Anisi, D. (Take of essence of anise, one fluid ounce; distilled water, half a gallon. Mix with agitation and filter through paper). Dose, f3ss. to f3ij.

ARMORACIA. *Horse-radish* (described in the division *Sialogogues*), is sometimes used as a warm stimulant, chiefly as an adjunct to other medicines; it was formerly classed amongst the Antiscorbutics, but is little employed in the present day. The following are the officinal preparations:—*Infusum Armoraciæ compositum*, L. (Horse-radish root sliced; mustard, bruised, of each, ʒj.; compound spirit of horse-radish, f3j.; boiling distilled water, Oj.; macerate the root and the seeds in water for 2 hours in a vessel lightly covered, and strain, then add the compound spirit of horse-radish). Dose, f3j. to f3ij.—*Spiritus Armoraciæ compositus*, L. (Horse-radish root, sliced; and dried orange peel, of each, ʒxx.; nutmegs, bruised, ʒv.; proof spirit, cong. j.; water, Oij.; mix and distil a gallon). Dose, f3j. to f3iv. Sliced horse-radish is a useful addition to the warm foot-bath to render it more stimulant.

ARNICA MONTANA. *Leopard's bane.* *Flowers, leaves and root of Arnica montana.* A native of the Alps, and of the Pyrenees; belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnæan class and order *Syngenesia Superflua*.

BOTANICAL CHARACTERS.—Perennial, about a foot high; Stem, hairy, simple and single flowered, or compound and many flowered; Leaves, oval, entire; Flowers, golden-yellow.

PROPERTIES.—The whole plant has a strong, peculiar odour, and a herbaceous, acrid, somewhat bitter taste. The flowers and leaves are collected in July, and the roots in September. The flowers are principally used at present; they consist of resin, on which probably their active properties chiefly depend, a bitter acrid principle (*cyttisin*), yellow colouring matter, gum, and some salts. Weber has also obtained from them a small quantity of blue volatile oil. They yield their active principles to water and to alcohol.

THERAPEUTICAL EFFECTS.—Arnica, which has been omitted from the last edition of the Dublin Pharmacopœia, bears a high character on the continent, particularly in Germany, as a stimulant in adynamic febrile affections, in chronic rheumatism, in paralysis, in amaurosis, &c., but it is very rarely used in this country. I have seen a tincture of the flowers prove useful in nervous head-ache. Arnica is one of the most prominent articles in the Homeöpathic Materia Medica, possessing, according to the professors of that doctrine, the most wonderful therapeutic powers, and being employed by them in the treatment of the most opposite diseases.

DOSE AND MODE OF ADMINISTRATION.—Of the powder of the

root, gr. x. three or four times a day. The flowers are usually given in the form of infusion or tincture.—*Infusum Arnicae*, AUST. (Arnica flowers, 3ss.; boiling water, f3xij.; infuse till cold, and strain). Dose, f3ij. to f3ss.—*Tinctura Arnicae*, POL. (Arnica flowers, 3iss.; proof spirit, f3xij.; digest for 7 days, express and strain). This tincture may be readily prepared by percolation, having previously macerated the flowers with a little of the spirit for 24 hours; or it may be prepared with the cut and bruised root, in the proportion of 3ij. of the root to Oj. of rectified spirit. Dose, f3ss. to f3ij.

INCOMPATIBLES.—The mineral acids; sulphate of iron; acetate of lead; and sulphate of zinc.

BALSAMUM TOLUTANUM. *Balsam of Tolu* (described in the division *Expectorants*), is an excellent stimulant in alopecia or baldness, it is best applied in the form of pomade as follows:—Prepared lard, 3ij.; white wax, 3ij.; melt together; remove from the fire, and when they are beginning to thicken, add with constant stirring, balsam of tolu, f3ij.; and oil of rosemary, min. xx.

CAJEPUTUM, D. CAJEPUTI, L. E. *Oil of Cajeput*. *Volatile oil of the leaves of Melaleuca cajeputi*, D.—*Melaleuca minor*, L. E. The tree from which this oil is obtained is a native of the Molucca Islands; and belongs to the Natural family *Myrtaceae*, and to the Linnæan class and order *Polyadelphica Icosandria*.

BOTANICAL CHARACTERS.—Trunk, about 20 feet high, crooked, with scattered branches; Leaves, smooth, deep green, 3-5 inches long; Flowers, white, in short terminal spikes.

PREPARATION.—The volatile oil is procured from the leaves by distillation; the leaves are gathered in the end of September, macerated for 24 hours with water, and then put into a copper still with sufficient water to prevent empyreuma. The oil comes over with the water into the receiver and floats on the surface.

PROPERTIES.—Cajeput oil is limpid, very mobile, transparent, and of a fine pale bluish-green colour. It has a strong, agreeable odour, resembling a mixture of camphor, roses, and peppermint; the taste is warm and aromatic, leaving a sensation of coldness in the mouth. Its specific gravity is about .919. It boils at 343°, and maybe obtained nearly colourless by re-distillation. The composition of this oil is $C^{10}H^9O$; it is soluble in alcohol.

Adulterations.—In consequence of its high price, and the great demand for it when the cholera first raged in the British isles, in 1832 and 1833, cajeput-oil was often counterfeited with oil of rosemary coloured and flavoured with camphor and cardamom seeds. The fraud was one difficult of detection, but at present it is met with

in a very pure state. As imported, it sometimes contains copper, which may be recognised by its affording a reddish precipitate when agitated with a solution of ferrocyanide of potassium.

THERAPEUTICAL EFFECTS.—Cajeput-oil is a powerful diffusible stimulant, at present not much used. When the Asiatic cholera first appeared, it was highly extolled as a remedy for that disease, but it did not retain its reputation long. It is much employed on the continent in chronic rheumatism, gout, hysteria, and other nervous affections. Dose, min. v. to min. x. rubbed up with sugar. It also forms a useful external rubefacient, for which purpose ʒss. may be dissolved in fʒij. of rectified spirit.

CALAMUS AROMATICUS, E. ACORUS, L. *Sweet Flag. Rhizome of Acorus calamus.* Indigenous; belonging to the Natural family *Acoraceæ* (*Orontiaceæ*, Lindley), and to the Linnæan class and order *Hexandria Monogynia*.

BOTANICAL CHARACTERS.—Rhizome, creeping, with many long roots; Leaves, 2-3 feet high, bright green; Flowers, pale green, arranged upon a spadix.

PROPERTIES.—The rhizome or root-stalk, in the dried state as met with in the shops, is in flattened pieces from 3-5 inches long, and half an inch broad, with a corrugated, yellowish-brown, scaly cuticle; internally it is spongy, with a pinkish-yellow hue. It has a very agreeable aromatic odour, and a pungent bitter taste. Sweet flag-root is composed of soft resin, extractive, gum, inulin, a trace of volatile oil, some salts and woody fibre. It yields its properties to alcohol, and to water.

THERAPEUTICAL EFFECTS.—An aromatic stimulant, scarcely ever employed. It may be used as an adjunct to tonics in debility of the digestive organs. Dose, in powder, gr. xx. to ʒj.; in infusion, (prepared by digesting ʒj. of the bruised rhizome in fʒxij. of boiling water for an hour), fʒj. to fʒij.

INCOMPATIBLES.—Acetate of lead.

CALX CHLORINATA, D. L. E. *Chlorinated lime. Bleaching salt of lime. Hypochlorite of lime. Chloride of lime. Bleaching Powder.*

PREPARATION.—It is an article of the *Materia Medica* in the *Dublin and Edinburgh Pharmacopœias*, and is usually prepared on the large scale for commercial purposes, by exposing hydrate of lime, from the purest lime, to chlorine gas, the latter being supplied so gradually as to prevent the heat occasioned by the combination from rising above 62°. The following process is given in the *London Pharmacopœia*, for its preparation:—“Take of hydrate of lime, lbj.; chlorine, a sufficiency; pass chlorine to the lime, spread in a proper vessel, until it is saturated. Chlorine is very readily evolved from hydrochloric acid added to binoxide of manganese, with a gentle heat.”

PHYSICAL PROPERTIES.—As commonly met with, this is a white

or yellowish-white powder, with a faint odour of chlorine, and an acrid, disagreeable, persistent taste.

CHEMICAL PROPERTIES.—Hypochlorite of lime is a mixture of 1 equivalent of chloride of calcium, 1 of tribasic hypochlorite of lime, and 4 of water. Exposed to the air it deliquesces, evolves chlorine, and attracting carbonic acid, is converted into carbonate of lime, and chloride of calcium. It is partially soluble in water, a little hydrate of lime being left undissolved; the solution has a strong alkaline reaction, and bleaches vegetable colours, especially if an acid be added, so as to evolve the chlorine. Its best characteristics are its peculiar odour in solution, its bleaching properties, and the white precipitates it affords with solutions of nitrate of silver, of carbonates, and of oxalates.

Adulterations.—This compound frequently contains a very small quantity of chlorine, either from originally having been badly prepared or from careless preservation; various processes have been described for *chlorometry*; but for medical purposes the tests for the purity of the powder as given in the *Edinburgh Pharmacopœia* are amply sufficient:—"Pale grayish-white; dry; gr. l. are nearly all soluble in f3ij. of water, forming a solution of the density 1027; and of which 100 measures, treated with an excess of oxalic acid, give off much chlorine, and if then boiled and allowed to rest 24 hours, yield a precipitate which occupies 19 measures of the liquid."

THERAPEUTICAL EFFECTS.—Hypochlorite of lime acts as a powerful stimulant, whether taken internally, or applied locally; it also possesses in a remarkable degree the property of destroying fetid effluvia, particularly when arising from the decay of animal matter, and of arresting or preventing the putrefactive process. In medicine it has been chiefly administered as an internal remedy in the advanced stages of typhoid fever, and in epidemic dysentery, being found particularly useful when the evacuations are very offensive. As a topical agent it is employed with benefit in the form of lotion to foul or gangrenous ulcers with excessive discharge, extensive burns or scalds, in purulent ophthalmia, in chronic cutaneous diseases, particularly scabies which it seldom fails to cure speedily and effectually, and as an injection in diseases of the rectum, the uterus, or vagina when accompanied by fetid discharges. In excessive mercurial salivation a gargle of one part of hypochlorite of lime dissolved in 100 parts of water will be found very effectual both in correcting the fetor, and checking the excessive secretion. This substance has been employed as a disinfectant, to prevent the spreading of epidemic diseases, and to destroy infection or contagion, but much doubts have been recently thrown on its disinfecting properties. It is also used for the purpose of destroying noxious effluvia arising from the decay of animal or vegetable matter, but for this purpose it is inferior to *Solution of chlorinated soda*. In poisoning with sulphuretted hydrogen or hydrosulphuret of ammonia, chlorinated lime or soda is the best antidote; the solution of it should be given internally and its vapour applied to the nostrils.

DOSE AND MODE OF ADMINISTRATION.—Internally, gr. ij. to gr. v. dissolved in water and sweetened with sugar, or in some aromatic distilled water. For external use solutions of various strengths are employed; in purulent ophthalmia, 3ss. to 3ij. in f3j. of water; for cutaneous diseases, 3iij. to Oj. of water; for a lotion or injection, gr. xx. to gr. xxx. in f3j. of water. The following is the official solution of the Dublin Pharmacopœia:—*Calcis chlorinatæ liquor*, D. (Take of chlorinated lime, half a pound; water, half a gallon: Blend well the water and chlorinated lime by trituration in a large mortar, and, having transferred the mixture to a stoppered bottle, let it be well shaken several times for the space of three hours. Pour out now the contents of the bottle on a calico filter, and let the solution which passes through be preserved in a well-stopped bottle. The specific gravity of this liquid is 1035). A fluid ounce contains nearly 44 grains of chlorinated lime. Solutions of this substance should always be filtered to remove the insoluble hydrate of lime, and kept in well-stoppered bottles to prevent the escape of the chlorine. When it is desired to disengage the chlorine rapidly from hypochlorite of lime, any weak acid may be added to the solution.

INCOMPATIBLES.—Sulphuric acid, and its salts; the alkalies; and all soluble carbonates, and oxalates.

In poisoning with chlorinated lime albuminous liquids, such as white of egg, milk, flour and water, &c., and emetics, should be given: acids must be carefully avoided.

CAMPHORA, D. L. E. *Camphor*. *Camphor of Camphora officinarum*, D. E.—*A peculiar concretion purified by sublimation, from Laurus camphora*, L. The Dublin and Edinburgh Colleges have adopted the botanical nomenclature of Nees von Esenbeck with reference to the Camphor-tree; it is a native of China and Japan, and belongs to the Natural family *Lauraceæ*, and to the Linnæan class and order *Enneandria Monogynia*. The camphor obtained from the *Dryobalanops camphora*, a native of Borneo and Sumatra, belonging to the Natural family *Dipteraceæ*, which was official in the former edition of the Dublin Pharmacopœia, is not brought to Europe.

BOTANICAL CHARACTERS.—A handsome tree with a straight trunk, branching at the top; Leaves, oval, pointed, shining, evergreen, emitting a strong odour of camphor when bruised; Flowers, small, whitish, in axillary and terminal panicles; Fruit, a small rounded, fleshy drupe, with an acrid, aromatic taste.

PREPARATION.—Camphor is procured from the small branches, the leaves, the wood, and the root of the tree, which are cut into small pieces, and boiled with water in an iron encurbit, to which an earthen capital is luted; the camphor sublimes, and is condensed on straws placed in the capital. In this coarse state it is imported into Europe, when it is purified by being sublimed in glass vessels, quick lime having been previously mixed with the crude camphor to retain the impurities. Borneo camphor is found in a concrete state in cavities and fissures in the heart of the tree.

PHYSICAL PROPERTIES.—Refined camphor is met with in hemi-

spherical masses, perforated in the centre; it is white, translucent, shining, fragile, with a crystalline fracture, nevertheless tough and pulverized with great difficulty, unless with the aid of a little rectified spirit. It is lighter than water, its density being 0.9857. It has a peculiar aromatic smell, and a bitter cooling taste.

CHEMICAL PROPERTIES.—Camphor is a species of solid volatile oil; it is composed of 1 equivalent of *camphogen* ($C^{20}H^{14}$) and 2 of water (Dumas). It evaporates at the ordinary temperature of the air, forming minute crystalline masses on the sides of bottles in which it is kept; in close vessels it fuses at 347° , and boils at 399° , condensing unchanged. It requires 1000 parts of water for its solution, to which, however, it imparts both odour and taste; but it may be suspended in large quantity in water by means of mucilage, sugar, yolk of egg, &c. It is very soluble in alcohol, ether, and the fixed and volatile oils. The solution in alcohol is precipitated by water. Milk dissolves an eighth of its weight of camphor, which it retains on the addition of water.

Adulterations.—Camphor is met with of great purity in this country, but it is frequently adulterated on the continent with muriate of ammonia. The sophistication may readily be detected by rubbing a suspected specimen in a mortar with a little quicklime, which liberates the ammonia; or by treating it with water, which dissolves out the muriate of ammonia.

THERAPEUTICAL EFFECTS.—Much difference of opinion exists as to the action of camphor on the animal economy, but the most constant and most marked effect which it produces is that of a general diffusible stimulant; and this is borne out by the symptoms which are caused by it when taken in an over-dose, viz:—great dyspnœa, violent palpitation of the heart, and continued vomiting. In the practice of medicine it has been used in a great variety of diseases, in consequence of the discrepancy which even still exists as to its effects; but the following are the principal maladies in which it proves decidedly beneficial. In the advanced stages of typhoid fever, when nervous symptoms as subsultus tendinum, delirium, &c., chiefly predominate. In spasmodic cholera, in which it should be given in large doses. In chronic bronchitis occurring in broken down habits, particularly when accompanied by profuse secretion; in spasmodic and nervous diseases, provided there is no inflammatory tendency in the system; in atonic gout, and chronic rheumatism; and in irritable and painful diseases of the urinary organs. As an external application camphor is very generally employed, dissolved in spirit or in oil, as an embrocation for muscular and rheumatic pains, for bruises, to glandular enlargements, and to chilblains. It is also used with much benefit as a stimulant to foul and indolent ulcers, and to gangrenous sores occurring in the old and debilitated. Made into an ointment with prepared lard, it has recently been employed on the continent, and it is stated with much success, in the treatment of chronic cutaneous diseases, particularly in those forms accompanied by much itching, which troublesome symptom it

appears speedily to allay. Camphor has been occasionally used in the form of vapour to promote diaphoresis when the skin is dry and harsh, and in old cutaneous affections.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. x. repeated at short intervals; it is usually given in the form of pill, or made into an emulsion with water by means of mucilage, sugar, yolk of egg, &c.; ʒij. of camphor may be permanently suspended in fʒviij. of water by means of ʒj. of thick mucilage, or it may be dissolved in new milk as observed above.—*Mistura Camphoræ*, D. L. E. ("Take of tincture of camphor, one fluid ounce; water, three pints. Shake the tincture and water together in a bottle, and, after the mixture has stood for twenty-four hours, filter through paper," D.—"Camphor, ʒss.; rectified spirit, min. x.; water, Oj.; first rub the camphor with the spirit, then with the water gradually poured in, and strain through linen," L.—"Camphor, ʒj.; sweet almonds and pure sugar, of each ʒss.; water, Oj.; steep the almonds in hot water, and peel them; rub the camphor and the sugar well together in a mortar; add the almonds; beat the whole into a smooth pulp; add the water gradually with constant stirring, and strain," E.). *Camphor julep*. This preparation contains so small a quantity of camphor, that it is only used as a vehicle for more active stimulants; Dose, fʒj. to fʒij.—*Mistura Camphoræ cum Magnesid*, E. (Camphor, gr. x.; carbonate of magnesia, gr. xxv.; water, fʒvj.; triturate the camphor and the carbonate of magnesia together, adding the water gradually). The carbonate of magnesia enables the water to dissolve more of the camphor, and also gives to the mixture slight antacid properties; Dose, fʒss. to fʒj.—*Aqua Camphoræ*, U. S. (Camphor, ʒij.; alcohol, min. xl.; carbonate of magnesia, ʒj.; distilled water, Oij.). One fluid ounce contains gr. iij. of camphor; Dose, fʒss. to fʒiss. Sir James Murray has recently introduced a solution of camphor equal in strength to this, prepared by dissolving camphor in the *Aqua Magnesicæ bicarbonatis*.—*Tinctura Camphoræ*, D. L. E. (Camphor (in small fragments, D.), ʒj. (ʒv., L. ʒiiss., E.); rectified spirit, fʒviij. (Oij., L. E.); dissolve the camphor in the spirit). *Camphorated spirit*; for external use; an excellent application when applied with friction for muscular and rheumatic pains. The camphor is partly precipitated by the addition of water. It is used for the preparation of camphor mixture in the last edition of the Dublin Pharmacopœia.—*Essence of Camphor*, (Tincture of myrrh, fʒss.; tincture of camphor, fʒiss.; rectified spirit, fʒiv.; mix). The tincture of myrrh renders this preparation miscible with water. About min. l. will make a pint of ordinary camphor julep.—*Linimentum Camphoræ*, D. L. E. (Camphor (in thin slices, D.), ʒj.; olive oil, fʒiv.; dissolve the camphor in the oil (with a gentle heat, D.) by trituration). A stimulating embrocation for deep-seated inflammation, glandular swellings, &c.—*Linimentum Saponis*, D. L. E. ("Take of Castile soap, reduced to powder, two ounces; camphor, one ounce; proof spirit, sixteen fluid ounces. Dissolve the soap in the spirit with a gentle heat, then add the camphor, and, when it is dissolved, filter through

paper; or, allow it to stand for some time, and decant the clear liniment," D.—"Soap, ʒiij.; camphor, ʒj.; spirit of rosemary, fʒxvj.; Dissolve the camphor in the spirit; afterwards add the soap, and macerate with a gentle heat till it is dissolved," L.—"Castile soap, ʒv.; camphor, ʒiiss.; oil of rosemary, fʒvj.; rectified spirit, Oij.; digest the soap in the spirit for 3 days; add the camphor and oil, and agitate briskly," E.). *Soap Liniment*; *Opodeldoc*. A useful stimulating liniment.—*Camphor Ointment*, (Prepared lard, ʒj.; camphor, reduced to fine powder, ʒss.; mix intimately).

INCOMPATIBLES.—The following observations of M. Planche, should be borne in mind in prescribing camphor:—With benzoïn, balsam of tolu, ammoniac, and mastich, it forms a soft mass which does not retain the pilular form; camphor is completely deprived of odour by being mixed with assafoetida, galbanum, sagapenum, and balsam of tolu; and the odour is very much weakened by olibanum, mastich, ammoniac, opoponax, benzoïn, and resin of guaiacum.

CAPSICUM. *Cayenne Pepper* (described in the division *Epispastics*), is not much employed in medicine internally; it is a good stimulant in those forms of dyspepsia which depend on enfeebled and languid digestion, and in the collapse of cholera and of typhus. As a topical remedy it is used with much benefit as an adjunct to stimulating gargles in cynanche maligna, and in all forms of relaxed sore throat. For this purpose either the tincture or *Chili vinegar* is generally employed. The dose of powdered capsicum is from gr. ij. to gr. viij., made into pill with crumb of bread.—*Tinctura Capsici*, D. L. E. (Capsicum, bruised, ʒiss. (ʒx., L. E.); proof spirit, Oj. (Oij. L. E.); macerate (digest, E.) for 14 (7, E.) days (strain, express, D.) and filter, "squeezing the residuum. This tincture is best prepared by percolation, which may be commenced so soon as the capsicum is made into a pulp with a little spirit," E.). Dose, *internally*, min. xx. to fʒj.; as an adjunct to gargles, fʒiv. to fʒvj. in fʒviij. of an aqueous vehicle.—*Chili Vinegar*, (prepared by infusing ʒss. of cayenne pepper in Oij. of white wine vinegar, for 10 days, and straining), is added to gargles in the proportion of fʒj. to fʒviij. of infusion of roses.—*Cayenne Lozenges* allowed to dissolve slowly in the mouth are very useful in the hoarseness and relaxed sore throat of public speakers and singers.

INCOMPATIBLES.—Ammonia; alkaline carbonates; sulphates; acetate of lead; nitrate of silver; and corrosive sublimate.

CARDAMINE, L. *Cuckoo-flower*. The flowers of *Cardamine pratensis*. Indigenous; belonging to the Natural family *Cruciferae* (*Brassicaceae*, Lindley), and to the Linnæan class and order *Tetradynamia Siliquosa*.

The flowers of this plant are blush-coloured; they have a slight aromatic odour, and a pungent, bitter taste. Their virtues depend on a trace of volatile oil, and some bitter extractive which they contain; though at one time highly spoken of as stimulants in epilepsy and in spasmodic asthma, they have completely fallen into disuse. The dose of the dried flowers was from ʒij. to ʒiij. several times a day.

CARDAMOMUM, D. L. E. *Cardamoms.* The seeds of *Elettaria cardamomum*, D.—Seeds of *Alpinia cardamomum*, L.—Fruit of *Renealmia cardamomum*, E. The various sorts of cardamoms met with in commerce are obtained from the plants above enumerated, or from nearly allied species; but the true officinal or lesser cardamom is the product of that indicated by the Dublin College. It is a native of Malabar; and belongs to the Natural family *Zingiberaceæ*, and to the Linnaean class and order *Monandria Monogynia*.

BOTANICAL CHARACTERS.—Stem, erect, 6-9 feet high, perennial; Leaves, 1-2 feet long, enveloping the stem with their spongy sheaths; Scapes, several, arising from the base of the stem, 1-2 feet long; Flowers, alternate, on sub-erect racemes, 2-3 inches long, greenish-white with violet stripes; Capsule, oval, 3-celled.

PHYSICAL PROPERTIES.—Cardamoms are the dried fruit, they are gathered in November; as met with in commerce, each fruit is ovato-oblong, obscurely triangular, from three lines to an inch in length, of a pale brownish-yellow colour, coriaceous. They contain numerous, angular, reddish-brown seeds. They have an agreeable aromatic odour, and a grateful pungent taste.

CHEMICAL PROPERTIES.—Cardamoms are composed of volatile oil, fixed oil, fecula, colouring matter, mucilage, and nitrogenous matter; they yield their active principles to water and to alcohol. A cooled decoction is rendered blue by tincture of iodine.

THERAPEUTICAL EFFECTS.—Cardamoms are amongst the most agreeable of the aromatic stimulants, and are commonly employed as adjuvants to more active medicines of this class, or to correct the griping properties of some purgatives.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. v. to gr. xx.—*Tinctura Cardamomi*, L. E. (Cardamom seeds, bruised, ʒiiiss. (ʒivss., E.); proof spirit, Oij.; “macerate for 14 days and strain,” L.—“Digest for 7 days, strain, squeeze the residuum and filter the liquors. This tincture may be better prepared by the process of percolation in the same way with the tincture of capsicum, the seeds being first ground in a coffee mill,” E.). An aromatic adjunct to mixtures in doses of fʒj. or fʒij.—*Tinctura Cardamomi composita*, D. L. E. (“Take of cardamom seeds, bruised; caraway seeds, bruised, of each, half an ounce; cinnamon, bruised, one ounce; cochineal, in powder, two drachms; proof spirit, three pints: macerate for fourteen days, strain, express, and filter,” D.—“Cardamom

seeds, bruised; and caraway, bruised, of each, 3iiss.; cochineal, powdered (bruised, E.) 3j.; cinnamon, bruised, 3v.; raisins, 3v.; proof spirit, Oij.; macerate for 14 (7, E.) days and strain, [express strongly the residuum and filter the liquors. This tincture may be also prepared by the method of percolation, if the solid materials be first beat together, moistened with a little spirit, and left thus for 12 hours before being put into the percolator, E.]” L. E.). Dose, f3j to f5ij.

INCOMPATIBLES.—Acids; sulphate of iron; and corrosive sublimate.

CARUI, L. E. CARUM CARUI, SEMINA, D. *Caraway*. The fruit (Seeds, D.) of *Carum carui*. Indigenous; belonging to the Natural family *Umbelliferae* (*Apiaceae*, Lindley), and to the Linnæan class and order *Pentandria Digynia*.

BOTANICAL CHARACTERS.—Biennial; Stem, 1-2 feet high; Leaves, doubly pinnated, cut into linear segments; Flowers, white, or pale flesh-coloured, in dense umbels.

PROPERTIES.—The fruit commonly called *caraway-seeds* does not require description; it has an agreeable fragrant odour, and a warm aromatic taste. It contains about $5\frac{1}{2}$ per cent. of a light yellow volatile oil, upon which its aromatic properties depend.

THERAPEUTICAL EFFECTS.—Caraway is an agreeable aromatic stimulant, much employed by the cook and confectioner as a seasoning and flavouring agent. In medicine it is used for giving warmth to other preparations.

DOSE AND MODE OF ADMINISTRATION.—of the seeds, 3j. to 3ij.—*Oleum Carui*, D. L. E. (Prepared according to the general directions for distilling volatile oils). Frequently added to cathartic pills and boluses; Dose, min. j. to min. x. This oil is often adulterated with oil of turpentine, which may be detected by the odour when dropped on a heated spatula.—*Aqua Carui*, D. L. (“Take of essence of caraway, one fluid ounce; distilled water, half a gallon: mix with agitation, and filter through paper,” D.—“Caraway, bruised, 1biss.; proof spirit, f3vij.; water, cong. ij.; distil a gallon,” L.). Used as an aromatic vehicle for other medicines, and in the flatulent colic of children; Dose, f3j. to f3iv.—*Essentia Carui*, D. *Spiritus Carui*, L. E. (“Take of oil of caraway, one fluid ounce; rectified spirit, nine fluid ounces: mix with agitation,” D.—“Caraway, bruised, 3xxij.; proof spirit, cong. j.; water, Oij.; mix, and with a slow fire distil a gallon,” L.—“Caraway, bruised, 1bss.; proof spirit, Ovij.; macerate for two days in a covered vessel, add Oiss. of water, and distil off Ovij.” E.). Aromatic and stimulant; Dose, f3j to f3ij.

CARYOPHYLLUS AROMATICUS, D. CARYOPHYLLUS; CARYOPHYLLI OLEUM, L. E. *Cloves*,—and their volatile oil, L. E. *Dried*

undeveloped flowers (dried buds, L.) of Caryophyllus aromaticus, D. L. E.—and the volatile oil distilled from them (distilled from the flowers, L.) L. E. The clove tree is a native of the Molucca Islands, and grows freely in various parts of the East and West Indies. It belongs to the Natural family *Myrtaceæ*, and to the Linnæan class and order *Polyandria Monogynia*.

BOTANICAL CHARACTERS.—Stem, 15-30 feet high; Leaves, opposite, coriaceous, dotted, obovato-oblong; Flowers, whitish, numerous, in terminal or axillary cymes.

PROPERTIES.—Cloves are the undeveloped flowers, consisting of the tubular calyx with the unexpanded corolla, forming a small round ball between its four teeth. Their odour is peculiar, agreeably aromatic, and their taste pungent, somewhat acrid. They consist of 18 per cent. of volatile oil, 6 of an almost tasteless resin (*Caryophyllin*), 13 of tannin, 4 of extractive, 13 of gum, 28 of lignin, and 18 of moisture, (Tromsdorff). The volatile oil is an article of the *Materia Medica* in the London and Edinburgh Pharmacopœias. As obtained by distillation it consists of two volatile oils, one heavier, the other lighter than water, a mixture of the two forming oil of cloves of commerce. It is at first pale yellow, but gradually acquires a reddish tint; it has the odour and taste of cloves in a marked degree; it is very soluble in alcohol, ether, strong acetic acid and the fixed oils; and but very sparingly soluble in water, in which it sinks, its density being about 1.060. Cloves yield their properties to water and to alcohol.

Adulterations.—Cloves from which the oil has been procured by distillation are sometimes mixed with good cloves; they may be distinguished by their lightness, and by their not becoming greasy when bruised with the nail. The oil is sometimes adulterated with oil of turpentine, which may be detected by the odour when it is dropped on a heated spatula.

THERAPEUTICAL EFFECTS.—Cloves and their oil are aromatic stimulants, and are employed in medicine as flavouring or corrective adjuncts to other substances; they are extensively used by the cook and confectioner. The oil dropped into the hollow of a carious tooth will often relieve tooth-ache.

DOSE AND MODE OF ADMINISTRATION.—In substance, gr. x. to 3ss.—*Oleum Caryophylli*, D. L. E. ("Prepared according to the general directions for distilling volatile oils," D.). Dose, min. ij. to min. viij.—*Infusum Caryophylli*, D. L. E. (Cloves, bruised, 3ij. (3iij. L. E.); boiling water (distilled, L.), f̄ix. (Oj. L. E.); infuse (macerate, L.) for one hour (two hours, L. E.) in a covered vessel, and strain; "the product should measure about f̄viiij." D.). An aromatic vehicle for more active medicines. Dose, f̄3j. to f̄3ij.

INCOMPATIBLES.—*With the infusion.* The mineral acids; lime water; sesqui-salts of iron; sulphate of copper; nitrate of silver; acetate of lead; tartar emetic; and gelatine.

CASSIÆ CORTEX ET OLEUM, E. *Cassia-bark. Oil of Cassia.* Bark and volatile oil of the bark of *Cinnamomum cassia*. The bark met with in English commerce is procured from the *Cinnamomum aromaticum* (NEES), as indicated by the Edinburgh College. It is a native of China, and is cultivated in Java; it belongs to the Natural family *Lauraceæ*, and to the Linnæan class and order *Enneandria Monogynia*.

BOTANICAL CHARACTERS.—Stem, arborescent, about 50 feet high; Leaves, oblongo-lanceolate, triple-nerved, the nerves vanishing at the point of the leaf; Petioles, and younger branches, silky-tomentose; Flowers, white, in panicles.

PHYSICAL PROPERTIES.—No account has been given of how cassia is prepared, but it is more than probable that it is by a process similar to that by which cinnamon is procured. It is imported from Singapore in bundles tied with slips of the bamboo cane; it resembles cinnamon in appearance, and is often sold for it, but it is darker coloured, much thicker, and in simple quills. The odour is not so fragrant as that of cinnamon, and the taste is more pungent and somewhat bitter.

CHEMICAL PROPERTIES.—Cassia bark consists of 0·8 per cent. of volatile oil, 4 of resin, 14·6 of extractive, with woody fibre, &c.; the volatile oil is always imported, it is of a wine-yellow colour, and has the odour and flavour of the bark; it is heavier than water, its density being 1·095. Cassia bark yields its active properties to alcohol, but only partially to water. The undeveloped flowers of *Cinnamomum aromaticum* are imported under the name of CASSIA BUDS (*Clavelli Cinnamomi*). They have the same properties as the bark, but are not employed in medicine.

THERAPEUTICAL EFFECTS.—Cassia and its preparations are precisely analogous in their operation to cinnamon, for which, as being much cheaper, they are usually substituted; their odour and taste perhaps is not quite so agreeable, and some have held them to be more astringent.

DOSE AND MODE OF ADMINISTRATION.—Of the bark, powdered, gr. x. to ʒss.—*Oleum Cassiæ*, E., min. ij. to min. v.—*Aqua Cassiæ*, E. (Cassia bark, bruised, ʒxviij.; water, cong. ij.; rectified spirit, fʒij.; mix together and distil off one gallon). An aromatic vehicle for more active medicines; Dose, fʒj. to fʒiv.—*Spiritus Cassiæ*, E. (Cassia bark in coarse powder, lbj.; proceed as for spirit of caraway). Dose, fʒss. to fʒj.—*Tinctura Cassiæ*, E. (Cassia bark, in moderately fine powder, ʒij. ʒij.; proof spirit, Oij.; digest for 7 days, strain, express the residuum strongly and filter. This tincture is more conveniently made by percolation, the cassia being allowed to macerate for 12 hours in a little of the spirit before being put into the percolator). Dose, fʒj. to fʒij.

INCOMPATIBLES.—The sesqui-salts of iron, and gelatine.

CEREVISIÆ FERMENTUM, D. L. *Yeast; Barm; A vegetable*

product developed in vinous liquids during the process of fermentation. Yeast is employed as a stimulant in the advanced stages of typhoid fevers, and in the form of enema in tympanitis, and has been highly spoken of in cases where wine is inadmissible in consequence of inflammatory symptoms. Its principal use at present is for the preparation of a stimulating cataplasm for foul and irritable sores, the fetor of which it corrects, and at the same time promotes the separation of the sloughs. It has been used on the continent with great benefit as an application to recent bruises; it is simply spread on lint, and the injured parts covered with it; the sooner it is applied after the accident, the more prompt and certain are its effects.—*Cataplasma Fermenti*, L. (Yeast, Oss.; wheaten flour, ℥bj.; mix, and apply a gentle heat until they begin to rise). This cataplasm should be renewed every six or eight hours; if it occasion much pain, the quantity of flour ought to be increased. The dose of yeast for internal use is two tablespoonfuls every three hours, it may be given with camphor mixture or with peppermint water.

CHLORINII LIQUOR, D. CHLORINEI AQUA, E. *Chlorine water.*
Concentrated watery solution of Chlorine (with a little sulphate of soda, E.).

PREPARATION.—*Dublin*.—"Take of peroxide of Manganese, in fine powder, half an ounce; muriatic acid of commerce, three fluid ounces; distilled water, twenty-four ounces: introduce the peroxide of manganese into a gas bottle, and, having poured upon it the muriatic acid diluted with two ounces of water, apply a gentle heat, and, by suitable tubes, cause the gas, as it is developed, to bubble through two additional ounces of the water placed in an intermediate small phial, and then to pass to the bottom of a three-pint bottle, containing the remainder of the water, and whose mouth is loosely plugged with tow. When the air has been entirely displaced by the chlorine, let the bottle be disconnected from the apparatus in which the gas is generated, corked loosely, and shaken until the chlorine is absorbed. It should be now transferred to a pint bottle with a well-ground glass stopper, and preserved in a cool and dark place."
Edinburgh.—"Muriate of soda, gr. lx.; sulphuric acid (commercial), fʒij.; red oxide of lead, 350 grains; water, fʒviij.; triturate the muriate of soda and oxide together; put them into the water contained in a bottle with a glass stopper; add the acid, agitate occasionally till the red oxide becomes almost white. Allow the insoluble matter to subside before using the liquid."

PHYSICAL PROPERTIES.—Prepared according to the directions of the Dublin Pharmacopœia, this is a yellowish-green liquid, with the suffocating odour of chlorine, and an acrid styptic taste.

CHEMICAL PROPERTIES.—This solution contains about twice its bulk of chlorine gas; it bleaches all vegetable colours. By long keeping, particularly if exposed to light, it is converted into a weak solution of muriatic acid, and oxygen is evolved: in consequence of these disadvantages, the Edinburgh Pharmacopœia contains a formula, given above, by which an aqueous solution of chlorine may be obtained in a few hours. It contains a small quantity of sulphate of soda dissolved in it, which, however, can in no wise interfere with its medicinal employment; and a white sulphate of lead remains as

an insoluble precipitate in the bottom of the bottle. Chlorine water is characterised by its bleaching properties, by its power of dissolving leaf gold, and by its not effervescing with carbonate of lime.

THERAPEUTICAL EFFECTS.—Taken in large quantity, chlorine water acts as a powerful irritant poison. In medicinal doses it operates as a stimulant, and as such is employed with benefit in the advanced stages of typhoid fevers and of epidemic dysentery, in malignant sore throat, and in chronic diseases of the liver. Chlorine gas diluted with common air has been inhaled in chronic bronchitis and in phthisis, but although the symptoms are often ameliorated under its employment, the benefit produced is not permanent. Externally, chlorine water has been used largely diluted as a wash to foul and indolent ulcers and for chronic cutaneous diseases, in the form of gargle in cynanche maligna, and as a local bath in hepatitis.

DOSE AND MODE OF ADMINISTRATION.—f3ss. to f3ij. in as many ounces of water sweetened with syrup. For external use, f3j. may be diluted with f3j. of water.

INCOMPATIBLES.—Nitrate of silver; and the acetates of lead.

In poisoning with chlorine water the best antidote is albumen, as white of egg, or in its absence, milk or flour.

CINNAMOMUM ZEYLANICUM, D. **CINNAMOMUM**, L. E. **CINNAMOMI OLEUM**, L. E. *Cinnamon. Bark of Cinnamomum zeylanicum*, D.—*Bark, and volatile oil of Laurus cinnamomum*, L.—*of Cinnamomum zeylanicum*, E. The cinnamon tree is a native of Ceylon and Malabar; it belongs to the Natural family *Lauraceæ*, and to the Linnæan class and order *Enneandria Monogynia*.

BOTANICAL CHARACTERS.—Stem, arborescent, about 30 feet high; Branches, obscurely 4-cornered; Leaves, tapering into a blunt point, 3-nerved, smooth, and perfectly free from down, as also are the leaf stalks; Flowers, in terminal and axillary stalked panicles.

PREPARATION.—The inner bark of the branches, and the volatile oil obtained from it are used in medicine. The bark is taken from branches which are three years old, they are lopped off the trees in the rainy season, and the bark immediately removed by making two opposite longitudinal incisions; the epidermis and green pulpy matter are afterwards scraped off, the smaller pieces introduced into the larger ones, and dried in the sun, the pieces contracting as they dry into the form of quills. The oil which is an article of the *Materia Medica* in the London and Edinburgh Pharmacopœias, is obtained by macerating the coarser pieces of bark and the trimmings in sea water for 48 hours, and submitting them to distillation.

PHYSICAL PROPERTIES.—Cinnamon is imported from Ceylon in bales and in boxes, some is also brought from Malabar. Three sorts are usually distinguished in commerce; the finest is in splintery rolls consisting of compound quills, the smaller being inclosed within the larger, from 30 to 40 inches in length; the pieces are very thin, generally not much thicker than writing paper, of a light brownish-yellow colour, smooth on the surface, with a splintery fracture. The odour is aromatic and fragrant, and the taste warm, sweetish, and

feebly astringent. The inferior kinds are in coarser quills, not so much rolled, of a darker brown colour, and with a less agreeable odour and taste. Oil of cinnamon is imported from Ceylon; it is of a pale wine yellow colour, becoming darker by age, and possesses intensely the peculiar odour and taste of the bark; it is heavier than water, its density varying from 1.038 to 1.041 (Christison).

CHEMICAL PROPERTIES.—Cinnamon bark consists of volatile oil, tannin, mucilaginous extractive, an acid, resin, colouring matter, and woody fibre. It yields its properties partially to water but more completely to alcohol. The volatile oil constitutes about 6 parts in a thousand of the fresh bark; it consists of a light and heavy oil which may be obtained separate by distillation. The composition of oil of cinnamon is $C^{20}H^{11}O^2$ (Mulder); by exposure to the air it absorbs oxygen, and is converted into a mixture of *cinnamic acid*, two peculiar resins and water. Strong nitric acid converts oil of cinnamon into a solid crystalline mass.

Adulterations.—Cinnamon bark may be distinguished by its physical properties from cassia bark which is often sold for it. The oil may be distinguished from oil of cassia by its more fragrant odour, and by the taste of the latter being more acrid and burning. The tests of the Edinburgh Pharmacopœia for the purity of oil of cinnamon apply equally to oil of cassia:—"Cherry-red when old; wine yellow when recent; odour purely cinnamomic; nitric acid converts it nearly into a uniform crystalline mass."

THERAPEUTICAL EFFECTS.—Cinnamon is an excellent warm stimulant, and in consequence of its agreeable flavour is very much employed in medicine, principally as an aromatic adjunct to other substances. It is also very commonly used as a vehicle for more active medicines. The oil is not much employed, but it forms an excellent addition to cathartic pill masses.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x to ʒss.—*Oleum Cinnamomi*, D. L. E. ("Prepared according to the general directions for distilling volatile oils," D.). Dose, min. j. to min. v.—*Aqua Cinnamomi*, D. L. E. ("Take of essence of cinnamon, one fluid ounce; distilled water, half a gallon: mix with agitation, and filter through paper," D.—"Cinnamon, bruised, lbss. (or oil of cinnamon, ʒij.); proof spirit, fʒviij.; water, cong. ij.; distil a gallon," L.—"Cinnamon, bruised, ʒxviij.; water, cong. ij.; rectified spirit, fʒiiij.; mix and distil off one gallon," E.). An agreeable vehicle for other medicines; Dose, fʒj. to fʒiv.—*Essentia Cinnamomi*, D. *Spiritus Cinnamomi*, L. E. ("Take of oil of cinnamon, one fluid ounce; rectified spirit, nine fluid ounces: mix with agitation," D.—"Oil of cinnamon, ʒij.; proof spirit, cong. j.; water, Oj.; mix, and with a slow fire distil a gallon," L.—"Cinnamon, in coarse powder, lbj.; proceed as for spirit of caraway," E.). Dose, *Dublin*, min. xx. to min. xxx.; *London, Edinburgh*. fʒj. to fʒss.—*Tinctura Cinnamomi*, L. E. ("Cinnamon bruised, ʒiiiss.; proof spirit, Oij.; macerate for 14 days and strain," L.—"Cinnamon, in moderately fine powder, ʒiiiss.; proof spirit, Oij.; proceed by percolation or digestion

as directed for tincture of cassia," E.). Dose, fʒj. to fʒss.—*Tinctura Cinnamomi composita*, D. L. E. ("Take of cinnamon, bruised, two ounces; cardamom seeds, bruised, one ounce; ginger, bruised, half an ounce; proof spirit, two pints: macerate for fourteen days, strain, express, and filter," D.—"Cinnamon, bruised, ʒj.; cardamom, bruised, ʒss.; long pepper, powdered; and ginger, sliced, of each, ʒiiss.; proof spirit, Oij.; macerate for 14 days and strain," L.—"Cinnamon, in coarse powder (fine, if percolation be followed); and cardamom seeds, bruised, of each, ʒj.; long pepper, ground finely, ʒiij.; proof spirit, Oij. This tincture is best prepared by percolation as directed for the compound tincture of cardamom; but it may also be made by digestion for 7 days, straining and expressing the liquor, and then filtering it," E.). Dose, fʒj. to fʒij.—*Confectio Aromatica*, D. L. ("Take of aromatic powder, five ounces; dried saffron, in fine powder, half an ounce; oil of cloves, half a fluid drachm; simple syrup, five fluid ounces; clarified honey, *by weight*, two ounces: rub the aromatic powder with the saffron, add the syrup and honey, and beat them together till thoroughly mixed; lastly add the oil of cloves," D.—"Cinnamon; nutmegs, of each, ʒij.; cloves, ʒj.; cardamoms, ʒss.; saffron, ʒij.; prepared chalk, ʒxvj.; sugar, lbij.; rub the dry ingredients together to a very fine powder, and keep them in a close vessel, and whenever the confection is to be used, add water gradually, and mix until they are thoroughly incorporated," L.). Stimulant, carminative and antacid, frequently used in mild cases of diarrhœa. Dose, gr. xx. to ʒj.; substances incompatible with chalk should not be prescribed in combination with the London preparation.—*Pulvis Aromaticus*, D. E. *Pulvis Cinnamomi compositus*, L. ("Take of cinnamon; ginger, of each, two ounces; cardamom seeds, freed from their capsules; nutmeg, of each, one ounce: rub each separately to powder, and, having mixed them by trituration, pass through a fine sieve. When prepared, the powder should be kept in well-stopped bottles," D.—"Cinnamon, ʒij.; cardamom seeds, ʒiss.; ginger, ʒj.; long pepper, ʒss.; rub together to a very fine powder," L.—"Cinnamon; cardamom seeds; and ginger, of each, equal parts; reduce to a very fine powder, and keep in well closed glass vessels," E.). Dose, gr. v. to gr. xx.—*Electuarium Aromaticum*, E. (Aromatic powder, one part; syrup of orange peel, two parts; mix, and triturate into a uniform pulp). Dose, gr. x. to gr. xl.

COCCULUS, E. *Cocculus Indicus*. *Fruit of Anamirta cocculus*. A native of Malabar and the eastern islands of India; belonging to the Natural family *Menispermaceæ*, and to the Linneæan class and order *Diœcia Monadelphîa*.

BOTANICAL CHARACTERS.—A strong climbing shrub; Bark, corky, ash-coloured, cracked; Leaves, roundish, leathery, smooth, 6 inches long, and as many broad; Flowers, in lateral compound racemes; Drupes, 2-3 globose.

PHYSICAL PROPERTIES.—The fruit commonly known under the name of *Cocculus Indicus*, is roundish, about the size of a large pea, with a dark brown wrinkled perisperm, within which is the bivalved, one-celled fruit; the kernel is white and oily, and does not completely fill the shell. It is void of odour, but has an intensely bitter taste.

CHEMICAL PROPERTIES.—The nucleus contains a peculiar, white, crystalline acid which has been named *Picrotoxin*, resin, gum, a fatty acid, and other unimportant substances; the pericarp contains another peculiar principle which has been named *Menispermin*, and which possesses properties very nearly similar to those of *Picrotoxin* which is the active principle of the drug; the latter is soluble in 150 parts of temperate water, 25 of boiling water, 2 of pure ether, and 3 of alcohol; it is insoluble in the fixed and volatile oils; its composition is $C^{12}H^7O^5$. *Cocculus Indicus* yields its active properties to alcohol, and but very imperfectly to either cold or boiling water.

Adulterations.—As met with in commerce, either from having been gathered before it is quite ripe or from long keeping, the kernel is often completely dried up, so as to leave the shell nearly if not quite empty. The *Edinburgh College* therefore directs, “that the kernels should fill at least two-thirds of the fruit.”

THERAPEUTICAL EFFECTS.—*Cocculus Indicus* is a powerful stimulant, in large doses producing death with tetanic convulsions and coma. It is used in India to poison fish; and in this country is often nefariously employed by brewers to give an artificial strength to beer. In medicine it is only employed externally to destroy vermin, and as a stimulating application in the form of ointment to furfuraecous eczema and porrigo of the scalp. *Picrotoxin* is highly poisonous, it may be used as a substitute for the drug.

PHARMACEUTICAL PREPARATIONS.—*Unguentum Cocculi*, E. (Take any convenient quantity of *Cocculus Indicus*, separate and preserve the kernels, beat them well in a mortar, first alone, and then with a little axunge; and then add axunge till it amounts altogether to five times the weight of the kernels.)—*Unguentum Picrotoxin*, JAGER. (*Picrotoxin*, gr. x.; axunge, ʒj.; mix intimately). Either of these ointments may be applied in small quantities to the scalp night and morning in the cases above mentioned, and the head well cleansed with soap and warm water at least once daily. They should be used with great caution when the skin is not entire, as danger may arise from absorption. At present they have nearly fallen into disuse, and consequently *Cocculus Indicus* has been omitted from the last edition of the Dublin and London Pharmacopœias.

CORIANDRUM, L. E. **CORIANDRUM SATIVUM**, SEMINA, D. *Coriander*. The fruit (Seeds, D.) of *Coriandrum sativum*. A native of the south of Europe, scarcely indigenous; belonging to the Natural

family *Umbelliferae* (*Apiaceae*, Lindley), and to the Linnæan class and order *Pentandria Digynia*.

BOTANICAL CHARACTERS.—Annual; Stem, erect, leafy, about 18 inches high; Leaves, scarcely stalked, all bipinnate, and cut; Flowers, white, often with a reddish tint.

PROPERTIES.—The fruit commonly called *coriander-seed* is round, about the size of white pepper, finely ribbed, of a brownish-yellow colour. When ripe it has an agreeable aromatic odour, and a warm peculiar taste. Its properties depend on volatile oil, of which it contains 4·7 parts in a thousand.

THERAPEUTICAL EFFECTS.—Coriander is employed in medicine as a flavouring adjunct in some officinal preparations, but is not used alone. The dose of the fruit is from 3ss. to 3j.

CUMINUM, E. CYMINUM, L. Cummin. *The fruit of Cuminum cyminum.* A native of Greece and Egypt; belonging to the Natural family *Umbelliferae* (*Apiaceae*, Lindley), and to the Linnæan class and order *Pentandria Digynia*.

The fruit of this plant, commonly called *cummin-seed*, possesses aromatic stimulant properties, which depend on the presence of volatile oil; but as the odour and taste are both strong and disagreeable, I cannot imagine on what grounds it has been retained in the London and Edinburgh Pharmacopœias, when we have so many agreeable medicines with precisely analogous properties. Dose, of the fruit, gr. x. to 3ss.

DAUCI FRUCTUS, L. DAUCI RADIX, D. L. E. *The common carrot. Fruit of Daucus carota, L. The root of Daucus carota (var. sativa, E.) D. L. E.* Indigenous; belonging to the Natural family *Umbelliferae* (*Apiaceae*, Lindley), and to the Linnæan class and order *Pentandria Digynia*.

BOTANICAL CHARACTERS.—Root, slender, yellowish, becoming thick and succulent by cultivation (*var. sativa*); Stem, 2-3 feet high, hispid; Leaves, pinnatisect; Flowers, in large umbels, white, except the central neutral one, which is blood-red.

PROPERTIES.—The fruit commonly called *carrot-seed* is obtained from the uncultivated variety; it is small, compressed, ovate, of a brown colour, fringed with a row of whitish spines; it has a strong aromatic odour and taste which depend on volatile oil. The root which is obtained from the cultivated carrot is too well known to require description. It contains a trace of volatile with some fixed oil, a peculiar, ruby-red crystalline substance (*Carotin*), uncrystallizable sugar, fecula, albumen, malic acid, &c.

THERAPEUTICAL EFFECTS.—The fruit of the wild carrot is carminative and stimulant, and by many is held to be diuretic; it is scarcely ever used at present. Carrot-root when boiled forms one of the most nutritive of our esculent vegetables. In medicine it is only used as an external application in the form of poultice to stimulate foul, indolent, and gangrenous sores; it corrects the fetor, and promotes the separation of the sloughs.

DOSE AND MODE OF ADMINISTRATION.—Of the fruit, gr. xx. to ʒj. A carrot poultice is prepared by boiling the root in water until it becomes soft enough to form a cataplasm.

ELECTRICITY. GALVANISM. MAGNETIC ELECTRICITY. These powerful agents in the treatment of disease require some short notice here. Their operation is that of either a general or local stimulant, according to the manner in which they are applied. Under their influence the vascular and nervous systems, more especially the latter, are excited; the pulse is increased in frequency, the muscles stimulated to involuntary action, and the general secretions augmented. The diseases, then, in which their use is indicated are those of debility; thus they are employed in all forms of paralysis of the nerves, both of sensation and of motion, when uncomplicated with any lesion of, or determination of blood to, the cerebro-spinal system; as in some forms of nervous deafness and of amaurosis, in old cases of paraplegia and hemiplegia, in paralysis of the muscles of the fore-arm from the poison of lead or of mercury, and in asphyxia. In suppression of the menstrual discharge arising from loss of tone in the uterine organs, electrical shocks passed through the pelvis (from the sacrum to the pubis) are frequently productive of great benefit. In the loss of muscular power attendant on chronic rheumatism, and in chorea and other allied convulsive disorders, the employment of electricity often proves serviceable also. My own experience of its use as a remedial agent leads me to place more reliance on its employment in *local* than in *general* paralysis—more particularly when a single muscle or a certain class of muscles have become paralysed from any special cause. Thus I have derived peculiar benefit from its use in that particular form of paralysis of the muscles of the fore-arm, which is produced by the action of lead, and which is so frequent a sequence of painters' colic; as also in those cases where a single muscle becomes paralysed, either from exposure to a draught of cold air, or from continued pressure on the nerve by which the muscle is supplied.* The different forms of electricity may in general be indifferently applied, but *galvanic* and *magnetic* electricity possess the advantage of being more readily employed, of not being interfered with by the state of the atmosphere, of the effects

* See Edinburgh Monthly Journal of Medical Science, Vol. 6, p. 225.

produced being more under control, and of the facility with which they may be applied to the different parts of the body; consequently these forms of electricity are in the present day most generally used.

For the application of common electricity, Leyden jars charged with the cylindrical or plate machine are used, and the usual directors employed for discharging them; the patient may or may not be placed on an insulating stool or chair, according to the effect which it is wished to produce.

Galvanic electricity is applied by means of the usual galvanic troughs and insulated directors; the apparatus is objectionable in consequence of its not being very portable, and also from its requiring the use of acids to bring it into operation.

Magnetic-electricity is the most convenient and simple mode of employing this agent in the practice of medicine; it is most readily applied by means of an instrument consisting of a small battery, on Smee's principle, in connection with a frame on which is fixed an upright straight magnet, surrounded by a bundle of iron wires, round which are coiled some thousand yards of insulated large and small copper wire, divided into seven different portions, each of which terminates separately in a small brass nob, brought up through the bottom of the frame; by means of which arrangement we can readily augment or diminish the power of the current that is being administered. The shocks are produced by the continuity of the stream of electricity being broken by the alternate attraction and repulsion, by the magnet, of a piece of soft iron, which is kept in contact with a platinized screw by means of a piece of watch spring.*

There is one objection to the use of this instrument as pointed out by Dr. Golding Bird, namely, that a series of positive or negative currents in a definite direction cannot be administered by means of it, inasmuch as negative and positive electricity are alternately discharged by each conducting wire. To remedy this defect in its construction, that physician has contrived a machine which he terms the "single-current electro-magnetic machine," of which a full description is given in his lectures on Electricity and Magnetism. But for my own part I regard the *stimulant* action of magnetic electricity, so to say, as its active principle, and therefore I cannot see the validity of his objection to the alternating current.

The good effects of any of the forms of electricity require a long time for their development, and its use should consequently be persevered in for some time, and not despaired of if immediate relief be not experienced. Care must, however, be taken to regulate the force or intensity of the shock, as over-excitement from electricity proves in general highly injurious in those very cases in which its employment, if properly regulated, is attended with the greatest service. In fine it should always be borne in mind, that electricity

* Magnetic-electrical instruments on the plan described above, are made by Mr. Robinson of Grafton-street, in this city, at a cost varying from £3 10s. to £4 4s.

is only to be considered as an auxiliary to other modes of treatment.

ELEMI, D. L. E. *Elemi*. The concrete resinous exudation from one or more unascertained plants, D. E. Resin of *Amyris elemifera*, L. It is quite uncertain from what plant this substance is obtained, and even its commercial route is involved in much obscurity; what is met with in this country is brought chiefly from Holland. American elemi is obtained from the *Icica icicariba*, a plant belonging to the Natural family *Amyridaceæ*. The term elemi is applied to three or four resins of very different appearance, and much of what is sold under this name appears to be a very composite substance. It is only employed in medicine in the form of ointment as a stimulating dressing to old and indolent ulcers.—*Unguentum Elemi*, D. L. ("Take of resin of elemi, four ounces; ointment of white wax, one pound: melt them together, strain through flannel, and stir the mixture constantly until it concretes," D.—"Elemi, ℞j.; common turpentine, ℥x.; suet, ℞ij.; olive oil, f℥ij.; melt the elemi with the suet; then remove them from the fire, and immediately mix with them the turpentine and the oil; afterwards press through a linen cloth," L.).

FÆNICULUM, L. E. FÆNICULUM OFFICINALE, SEMINA, D. *Fennel*. Fruit (Seeds, D.) of *Fœniculum officinale*, D. E.—Fruit of *Fœniculum vulgare*, L. *Fœniculum vulgare* (*Anethum fœniculum*, LINNÆUS) is an indigenous plant; belonging to the Natural family *Umbelliferae* (*Apiaceæ*, Lindley), and to the Linnæan class and order *Pentandria Digynia*.

BOTANICAL CHARACTERS.—Biennial; Stem, 3-4 feet high, fistulose; Leaves, much divided, with very slender segments; Flowers, dark yellow.

PROPERTIES.—The fruit, commonly called *fennel-seed*, is oval, about two lines long and one broad, of a dark brown colour; it has an agreeable, aromatic odour, and a warm sweetish, somewhat acrid taste. These properties depend on a volatile oil which it contains. The oil of fennel of the shops is usually obtained from a cultivated variety of *Fœniculum vulgare*, which in consequence of the sweeter taste of the fruit is known under the name of *Fœniculum dulce*.

THERAPEUTICAL EFFECTS.—Fennel is a warm aromatic stimulant, but is not much used in the present day; it may be employed in the same cases as anise and caraway.

DOSE AND MODE OF ADMINISTRATION.—In substance, ʒss. to ʒj.—*Oleum Fœniculi*, D. E. (Prepared from the fruit (or seeds, D.) according to the general instructions for obtaining volatile oils). Dose, min. ij. to min. x.—*Essentia Fœniculi*, D. (Take of oil of fennel, one fluid ounce; alcohol, nine fluid ounces: mix with agita-

tion). Dose, min. xx. to min. xxx.—*Aqua Fœniculi*, D. L. E. (Prepared in the same way as *Aqua Carui*, D. L.—as *Aqua Anethi*, E.). An aromatic vehicle for other medicines; Dose, f3j. to f3iv.

INULA, L. *Elecampane*. Root of *Inula helenium*. Indigenous; belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnæan class and order *Syngenesia Superflua*.

BOTANICAL CHARACTERS.—Root, thick, branching; perennial; Stem, 3-5 feet high, branched; Leaves, amplexicaul, ovate, wrinkled, downy beneath; Flowers, large, terminal, bright-yellow.

PROPERTIES.—Elecampane-root when dried has an aromatic odour, and a warm bitter taste. It consists of bitter extractive, soft resin, elecampane-camphor (*Helenin*), a variety of starch named *Inulin*, a trace of volatile oil, &c. It yields its active properties partially to water, but more completely to alcohol.

THERAPEUTICAL EFFECTS.—Elecampane is an aromatic stimulant, producing vomiting in large doses. It is scarcely ever used in medicine, and might be well spared from the *Materia Medica*. Dose, ʒj. to ʒij.

LAURUS NOBILIS, FOLIA ET BACCÆ, L. *Sweet-bay leaves and berries*. Leaves and berries of *Laurus nobilis*. A native of the South of Europe, cultivated in our shrubberies; it belongs to the Natural family *Lauraceæ*, and to the Linnæan class and order *Enneandria Monogynia*.

BOTANICAL CHARACTERS.—A small tree; Leaves, alternate, lanceolate, coriaceous; Flowers, in axillary umbels, yellowish; Fruit, a bluish-black, oval berry, one-seeded, about the size of a small nut.

PROPERTIES.—The leaves and fruit have an aromatic, rather agreeable odour, and a warm, somewhat bitter taste. These properties depend on a volatile oil which may be obtained by distillation. The berries contain also about 12 per cent. of a butyraceous fixed oil, which has been recently imported from Trieste.

THERAPEUTICAL EFFECTS.—The leaves, berries, and oils of the sweet bay are aromatic stimulants; but are scarcely ever employed in medicine. The fixed oil was formerly employed as a local stimulant in rheumatic and neuralgic pains, and is used as such with great benefit on many parts of the Continent in the present day. The leaves and berries may be administered in the form of infusion, prepared by infusing ʒiss. of either, bruised, in f3xij. of boiling water; Dose, f3ss. to f3ij.

LAVANDULA, L. E. LAVANDULA VERA, FLORES, D. *Lavender*.
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Flowers of Lavandula vera, D. E.—of *Lavandula spica*, L. It is from *Lavandula vera* (De Candolle) that the flowers are procured for medical use; this is a native of the central parts of Europe, and is cultivated in our gardens; it belongs to the Natural family (*Labiata* (*Lamiaceæ*, Lindley), and to the Linnæan class and order, *Didynamia Gymnospermia*.

BOTANICAL CHARACTERS.—Stem, shrubby, 1-2 feet high; Leaves, oblong-linear or lanceolate, quite entire; Flowers, purplish-gray, in whorls of 6-10 flowers, in interrupted spikes. It may be readily distinguished from *Lavandula spica*, by its taller stature, its narrower leaves, and the absence of bracts.

PHYSICAL PROPERTIES.—The flowers are gathered when in full bloom, and dried in the shade: they have a peculiar fragrant odour, and a warm, somewhat bitter, aromatic taste.

CHEMICAL PROPERTIES.—They contain volatile oil, tannin, bitter extractive, and woody fibre. The oil, *Oleum Lavandulæ*, D. L. E., is obtained by the usual process of distillation; it is of a pale yellow colour, has the peculiar fragrant odour of the flowers, and a warm aromatic taste. One pound of flowers yields about two drachms of oil. Its density according to Zeller is .870 to .890; its composition $C^{15}H^{14}O^2$. Lavender flowers yield their properties completely to alcohol, but only partially to boiling water.

THERAPEUTICAL EFFECTS.—Lavender is a very agreeable aromatic stimulant, and its officinal preparations are consequently much employed for giving warmth and flavour to other medicines.

DOSE AND MODE OF ADMINISTRATION.—The flowers in powder are added to sternutatories on account of their agreeable odour.—*Oleum Lavandulæ*, D. L. E. Dose, min. ij. to min. v.—*Spiritus Lavandulæ*, L. E. (Fresh lavender, ℞iiss.; rectified spirit, cong. j.; (water, Oij., L.); “Mix, and with a slow fire distil a gallon,” L. “Mix, and with the heat of a vapour-bath distil over Oviij.” E.). Used by the London and Edinburgh Colleges in the preparation of the following:—*Tinctura* (*Spiritus*, E.) *Lavandulæ composita*, D. L. E. (“Take of oil of lavender, three fluid drachms; oil of rosemary, one fluid drachm; cinnamon, bruised, one ounce; nutmeg, bruised, half an ounce; cloves, bruised; cochineal, in powder, of each, two drachms; rectified spirit, two pints: macerate for fourteen days, strain, express, and filter,” D.—“Spirit of lavender, Oiss. (Oij., E.); spirit of rosemary, Oss. (f3xij. E.); nutmegs, bruised 3iiss. (3ss. E.); cinnamon, bruised (in coarse powder, E.), 3iiss. (3j., E.); (cloves, bruised, 3ij., E.); red sandal-wood shavings, 3v. (3iij., E.); macerate for 14 (7, E.) days and strain; (strain through calico, E.)” L. E. This preparation, generally known as *Lavender Drops*, is used as a cordial and stomachic to relieve nausea, flatulence, lowness of spirits, &c.; Dose, min. xxx. to f3ij. in water, or dropped on white sugar.

INCOMPATIBLES.—Sulphate of iron.

LIMONUM CORTEX ET OLEUM, D. L. E. *The external rind (fresh*

rind, D.) of the fruit, and the volatile oil obtained from the rind, of *Citrus limonum*, D. L. E. *Lemon peel*, and oil of lemons. The lemon tree has been described in the division *Refrigerants*. Oil of lemons is obtained from the rind either by distillation or expression; the latter is the method usually followed; it is imported from Portugal and from France. It has a pale greenish-yellow colour, the fragrant odour of lemons, and a pungent aromatic taste; density .850. Its composition is $C^{10}H^8$, being isomeric with oil of turpentine. *Lemon peel* is of a yellow colour, has an agreeable aromatic odour, and a warm, somewhat bitter taste, both of which are much injured by drying. Care should be taken in peeling lemons to remove the outer yellow rind only; it should be dried without artificial heat, and is best preserved laid in alternate layers with sugar, and kept in well closed bottles. Lemon peel yields its properties to both alcohol and water.

THERAPEUTICAL EFFECTS.—Oil of lemons is an aromatic stimulant; it is only used internally to give an agreeable flavour to other medicines; as a topical remedy it is highly praised by the Germans as a stimulant in rheumatic and scrofulous ophthalmia, for which purpose it is dropped into the eye. Lemon peel is employed as a flavouring ingredient in infusions.

DOSE AND MODE OF ADMINISTRATION.—*Oleum Limonum*, D. L. E. Dose, min. ij. to min. v.—*Tinctura Limonis*, D. (Take of fresh lemon peel, cut thin, five ounces; proof spirit, one pint: macerate for fourteen days, strain, express, and filter). Dose, f3ss. to f3ij.; an agreeable adjunct to other medicines; it is used by the Dublin College in the preparation of syrup of lemons.

INCOMPATIBLES.—The mineral and vegetable acids; and lime water.

MASTICHE, D. L. E. *Mastich*. The resin (concrete resinous exudation, E.) of *Pistacia lentiscus*, (also of *Pistacia atlantica*, Lindley), Natives of the South of Europe and of the Levant; belonging to the Natural family *Anacardiaceæ*, and to the Linnæan class and order *Diœcia Pentandria*.

Mastich exudes from incisions made into the tree; it is in small, irregular, yellowish tears, which have a faint, agreeable odour, and a warm taste. It is scarcely ever used at present, but was at one time much employed as an ingredient in *dinner pills*. It enters into the composition of the *Tinctura Ammoniacæ composita*, L. (See page 331).

MELISSA, E. *Common Balm*. Herb of *Melissa officinalis*. A native of Central Europe, cultivated in our gardens; it belongs to the Natural family *Labiata* (*Lamiaceæ*, Lindley), and to the Linnæan class and order *Didynamia Gymnospermia*.

BOTANICAL CHARACTERS.—Herbaceous ; Leaves, broadly ovate, crenate, hairy above, smooth beneath ; Flowers, white, in one-sided, axillary whorls, shortly pedunculated.

PROPERTIES.—In the recent state the whole herb has an aromatic, citron-like odour, much of which is lost by drying, the taste is warm and bitter. It contains volatile oil, resin, bitter extractive, a trace of tannin, gum, &c. It yields its properties to boiling water by infusion.

THERAPEUTICAL EFFECTS.—Balm is a mild aromatic stimulant, at present never used except as a domestic remedy.—*Infusum Melissæ*, *Balm tea*, (prepared by infusing ʒij. of the fresh herb in Oss. of boiling water for a quarter of an hour), is given in doses of from fʒij. to fʒiv.

INCOMPATIBLES.—Sulphate of iron ; acetate of lead ; and nitrate of silver.

MENTHA PIPERITA, HERBA, D. L. E. *Peppermint. Herb of Mentha piperita.* Indigenous ; belonging to the Natural family *Labiata* (*Lamiaceæ*, Lindley), and to the Linnæan class and order *Didynamia Gymnospermia*.

BOTANICAL CHARACTERS.—Root creeping ; Stem, smooth, quadrangular ; Leaves, ovato-lanceolate, strongly serrated, acute, slightly hairy ; Flowers, violet coloured, in lax, short, interrupted spikes ; bractæ lanceolate.

PROPERTIES.—Peppermint has a peculiar, aromatic, to most persons agreeable, odour, and a warm pungent taste, leaving a peculiar impression of coldness on the mouth which is most marked during inspiration. These properties are due to a large quantity of volatile oil which exists in small vesicles or glands, chiefly in the leaves. This oil, *Oleum Menthæ piperitæ*, D. L. E., is obtained by the usual process of distillation, the quantity procured varies from a 200th to a 320th ; it is limpid and colourless, acquiring a greenish tint from age, with the odour and taste of the plant in an intense degree. It is soluble in alcohol, and when agitated with water imparts to it both odour and taste. Its density is .902, and its composition $C^{21}H^{20}O^2$ (Kane).

THERAPEUTICAL EFFECTS.—Peppermint is perhaps the most powerful aromatic stimulant of the *Labiata* plants ; and in consequence of its agreeable odour and taste is very generally added to nauseous medicines. It is also much employed to relieve sickness of the stomach, heartburn and flatulent colic.

DOSE AND MODE OF ADMINISTRATION.—Of the volatile oil, min. ij. to min. v. dropped on sugar.—*Aqua Menthæ piperitæ*, D. L. E. (“Take of essence of peppermint, one fluid ounce ; distilled water half a gallon : mix with agitation, and filter through paper,” D.—“Peppermint, dried, lbij. (or oil of peppermint, ʒij.) ; proof spirit, fʒvij. ; water, cong. ij. ; distil a gallon,” L.—“Peppermint, lbiv. if fresh, (lbij. if dry) ; water, cong. ij. ; rectified spirit, fʒij. ;

mix, and distil one gallon," E.). Employed to relieve flatulent colic, but chiefly as a vehicle for other medicines; Dose, fʒj. to fʒij.—*Essentia Menthæ piperitæ*, D. *Spiritus Menthæ piperitæ*, L. *Spiritus Menthæ*, E. ("Take of oil of peppermint, one fluid ounce; stronger spirit, nine fluid ounces: mix with agitation," D.—"Oil of peppermint, ʒiij.; proof spirit, cong. j.; water, Oj.; mix, and with a slow fire distil a gallon," L.—"Fresh peppermint, lbss.; proceed as for spirit of caraway," E.). Stimulant and carminative; Dose, min. xx. to fʒj.

MENTHA PULEGIUM, HERBA, L. PULEGIUM, D. E. *Pennyroyal*. *Herb of Mentha pulegium*. Indigenous; belonging to the Natural family *Labiata* (*Lamiaceæ*, Lindley), and to the Linnæan class and order *Didynamia Gymnospermia*.

BOTANICAL CHARACTERS.—This mint is distinguished by its prostrate stems, and small, frequently recurved leaves; both of which are thickly covered with short hairs.

PROPERTIES.—Pennyroyal has a strong, peculiar, aromatic odour, and a pungent, somewhat bitter, cooling taste; it contains a volatile oil on which its properties depend, and which is obtained by the usual process of distillation; it is of a pale greenish-yellow colour, with the odour and taste of the plant; its density is 0.925; and its composition $C^{10}H^8O$ (Kane).

THERAPEUTICAL EFFECTS.—Pennyroyal is identical in action with peppermint, but as its odour and taste are not so agreeable, it is much less used.

DOSE AND MODE OF ADMINISTRATION.—*Oleum Menthæ pulegii*, D. L. E. *Spiritus Menthæ pulegii*, L. *Aqua Menthæ pulegii*, D. L. E.: are all prepared with pennyroyal in the same manner as the corresponding preparations of peppermint. The doses also are the same.—*Essentia Menthæ pulegii*, D. (Take of oil of pennyroyal, one fluid ounce; rectified spirit, nine fluid ounces: mix with agitation). Dose, min. xx. to fʒj.

MENTHA VIRIDIS, HERBA, D. L. E. *Spearmint*. *Herb of Mentha viridis*. Indigenous; belonging to the Natural family *Labiata* (*Lamiaceæ*, Lindley), and to the Linnæan class and order *Didynamia Gymnospermia*.

BOTANICAL CHARACTERS.—Leaves, lanceolate, acute, glabrous, sessile; Spikes, interrupted, cylindrical, loose; Bractæas setaceous, somewhat hairy as well as the calyx.

PROPERTIES.—Spearmint has a strong, peculiar, to many persons disagreeable, odour, and a warm, bitter taste followed by a sense of coldness when air is drawn into the mouth; these properties are very

much lost by drying. They depend on a volatile oil, of which the fresh herb contains only a 500th part. This oil is of a light-yellow colour, acquiring a reddish-brown tint by age; it possesses intensely the odour and taste of the plant. Its density is 0.914; and its composition $C^{35}H^{28}O$ (Kane).

THERAPEUTICAL EFFECTS.—Spearmint resembles in its action peppermint; by some it has been said to repel the secretion of milk, and to act as an emmenagogue. As it is neither as powerful nor as agreeable as peppermint it is not so much used.

DOSE AND MODE OF ADMINISTRATION.—*Oleum Menthæ viridis*, D. L. E. *Essentia Menthæ viridis*, D. *Spiritus Menthæ viridis*, L. E. *Aqua Menthæ viridis*, D. L. E.: are all prepared with spearmint, in the same manner as the corresponding preparations of peppermint. The doses also are the same.—*Infusum Menthæ*, D. (Take of spearmint, dried, and cut small, three drachms; boiling water, half a pint: infuse for fifteen minutes, in a covered vessel, and strain. The product should measure about eight ounces). Used as a vehicle for other remedies in irritable states of the stomach; Dose, fʒj. to fʒij.

MYRISTICA, L. E. MYRISTICÆ OLEUM, L. E. MYRISTICÆ ADEPS, E. MYRISTICA MOSCHATA, D. Nutmegs. Kernel of the fruit, D. L. E.—and volatile oil from the kernel, L. E.—also concrete expressed oil (oil of mace) from the kernel of the fruit, E.—of *Myristica moschata*, D. L.—of *Myristica officinalis*, E. This tree (*Myristica fragrans*, Houtt) is a native of the Molucca Islands; belonging to the Natural family *Myristicaceæ*, and to the Linnæan class and order *Diœcia Monadelphica*.

BOTANICAL CHARACTERS.—A tree, 20-30 feet high; Leaves, aromatic, oblong, acuminate, smooth, simple nerved; Flowers, pale yellow, in axillary racemes; Fruit, pyriform, about the size of a peach, smooth, dehiscing by two nearly equal longitudinal valves, and exposing the fleshy, scarlet arillus (*mace*), closely embracing the shell, within which is contained the kernel (*the nutmeg*).

PROPERTIES.—Nutmegs are too well known to require description; they are imported from the Moluccas. They have a peculiar, fragrant, powerful odour, and a warm, aromatic taste. Nutmegs consist of 31.6 per cent. of fat butyraceous fixed oil, 6 of volatile oil, 2.4 of starch, 1.2 of gum, 0.8 of acid, and 54 of lignin (Bonastre). The volatile oil, *Oleum Myristicæ*, D. L. E., is obtained by distillation; it is usually imported, but the Dublin College directs it be prepared by the general process for obtaining volatile oils. It is colourless or slightly yellow, of a rather viscid consistence, and has the odour and taste of nutmegs. Its density is 0.948. The fixed oil, *Myristicæ adeps*, E., *oil of mace*, is procured by exposing bruised nutmegs to the vapour of boiling water, and pressing between heated plates of iron; it is imported in large rectangular cakes covered with the leaves of some monocotyledonous plant. It is a soft solid, of a reddish-

yellow colour, with the odour and taste of nutmegs. It consists of an aromatic volatile oil, mixed with three fats; two of which are readily dissolved by alcohol, and the third which is thus separated has been named *myristicine*. Mace is composed of volatile oil, red fat oil soluble in alcohol, yellow fat oil insoluble in alcohol, alcoholic extractive, amidin, lignin, &c. Nutmegs and mace impart both odour and taste to boiling water; but they yield their active properties more completely to alcohol.

Adulterations.—Nutmegs from which the volatile oil has been obtained, are sometimes mixed with good nutmegs, the holes which are bored in them being stopped up with powdered sassafras. This fraud is seldom attempted in the present day, it may be detected by the lightness of the nutmeg. Those nutmegs which are round, plump, heavy, and not worm eaten, should be chosen.

THERAPEUTICAL EFFECTS.—Nutmegs are agreeable aromatic stimulants, chiefly used as flavouring ingredients. Taken in large quantity they prove narcotic, and consequently their use should be avoided by those who have an apoplectic or paralytic tendency. The fixed oil has been employed externally as a stimulant in chronic rheumatism and paralysis.

DOSE AND MODE OF ADMINISTRATION.—In substance, gr. x. to gr. xxx.—*Oleum Myristicæ*, D. L. E. Min. j. to min. v. dropped on sugar.—*Essentia Myristicæ moschata*, D. *Spiritus Myristicæ*, L. E. ("Take of oil of nutmeg, one fluid ounce; stronger spirit, nine fluid ounces: mix with agitation," D.—Nutmegs, bruised, ʒiiss.; proof spirit, cong. j.; water, Oj.; mix, and (with a slow fire, L.) distil a gallon," L. E.). Stimulant and aromatic, an excellent addition to cathartic mixtures to prevent griping. The dose of the *essence* of the Dublin Pharmacopœia is min. xx. to fʒj.; that of the spirit of the other Colleges is from fʒj. to fʒiv.

OLIBANUM, L. *Gum-resin of Boswellia serrata* (*Libanus thurifera*, Colebrooke). A handsome lofty tree, a native of Coromandel and other parts of the East Indies; belonging to the Natural family *Amyridaceæ*, and to the Linnæan class and order *Decandria Monogynia*.

Olibanum is met with in the form of irregularly rounded, whitish or yellowish tears, semitransparent, powdery on the surface; they have a fragrant odour, and an aromatic somewhat bitter taste. They consist principally of volatile oil and resin, and are insoluble in either water or alcohol. This substance is generally supposed to be the true frankincense of the ancients; it possesses mildly stimulant properties, but in the present day is only employed as a fumigating agent. The dose for internal use would be from ʒss. to ʒj. made into an emulsion with yolk of egg or with mucilage.

ORIGANUM, L. E. *Herb of Origanum vulgare*. This, the common marjoram, is an indigenous plant belonging to the Natural family *Labiatae* (*Lamiaceae*, Lindley), and to the Linnæan class and order *Didynamia Gymnospermia*.

PROPERTIES.—It has a peculiar aromatic odour, and a warm pungent taste; these properties depend chiefly on volatile oil.—*Oleum Origani*, L., *Oil of Marjoram*, *Oil of Thyme*, is obtained from *Origanum vulgare* by the usual process of distillation. It is of a reddish colour, becoming darker by age, and has the odour and taste of the herb. Its density is 0.867; and its composition $C^{50} H^{40} O$. A hundred weight of the plant yields on an average from 8 to 10 ounces of oil.

THERAPEUTICAL EFFECTS.—Marjoram possesses the aromatic stimulant properties of the Labiate plants generally. In the present day it is but seldom used in medicine; the oil may be given in doses of from min. j. to min. iij. dropped on sugar. It is sometimes employed to relieve tooth-ache, dropped on cotton and placed in the hollow of a carious tooth. Dissolved in olive oil, it is used as a stimulating embrocation.

PIMENTA, D. L. E. *Pimento*; *Allspice*; *Jamaica pepper*. *Unripe berries* (dried, L.) of *Eugenia pimenta*, D. E.—of *Myrtus pimenta*, L. A native of the West Indies; belonging to the Natural family *Myrtaceae*, and to the Linnæan class and order *Icosandria Monogynia*.

BOTANICAL CHARACTERS.—A handsome tree, about 30 feet high; Leaves, oblong, pellucid-dotted, about 4 inches long; Flowers, numerous, greenish-yellow, in terminal bunches or panicles; Berry, succulent, dark-purple when ripe, 2-seeded.

PROPERTIES.—Pimento is in the form of round blackish berries, rough, umbilicated with the persistent teeth of the calyx. The odour resembles a mixture of cloves, cinnamon, and nutmegs, whence the name *allspice*; the taste is pungent and aromatic, like that of cloves. These properties depend principally on volatile oil, of which Bonastre obtained 10 per cent. from the husk and only 5 per cent. from the kernel. This oil, *Oleum Pimenta*, D. L. E., is obtained from the berries by the usual process of distillation; it is of a yellowish colour when first drawn, but soon acquires a reddish tint; it has the peculiar odour of allspice, and a burning aromatic taste. Oil of allspice of commerce is heavier than water, its density being about 1.020. It is a mixture of a heavy and light oil, which may be obtained separately by distillation with solution of potash, as the former forms crystalline compounds with the alkalies. Pimento communicates both odour and taste to boiling water, but it yields its properties more completely to alcohol.

THERAPEUTICAL EFFECTS.—Pimento is an aromatic stimulant, not

much employed in medicine. Its preparations are chiefly used to communicate warmth and flavour to other substances.

DOSE AND MODE OF ADMINISTRATION.—In substance from ʒss. to ʒj.—*Oleum Pimentæ*, D. L. E., min. ij. to min. v.—*Essentia Pimentæ*, D. (“Take of oil of pimenta, one fluid ounce; rectified spirit, nine fluid ounces. Mix with agitation”). Dose, min. xxx. to fʒj.—*Spiritus Pimentæ*, L. E. (Pimento, bruised, ʒiiss. (tʒss., E.); proceed as for spirit of nutmeg, L.—as for spirit of caraway, E.). Dose, fʒj. to fʒij.—*Aqua Pimentæ*, D. L. E. (“Take of essence of pimenta, one fluid ounce; distilled water, half a gallon. Mix with agitation, and filter through paper, D.”—“Pimento, bruised, tʒj. (or oil of pimento, ʒij., L.); proof (rectified, E.) spirit, fʒvij. (fʒijj. E.); water, cong. ij.; mix, and distil a gallon,” L. E.). Carminative and stimulant, used in the flatulent colic of children, and as a vehicle for other medicines. Dose, fʒj. to fʒij.

INCOMPATIBLES.—The sesqui-salts of iron.

PIPER LONGUM, L. E. *Long pepper*. *Dried spikes (Dried unripe fruit, L.) of Piper longum (Chavica roxburghii)*. A native of India, belonging to the Natural family *Piperaceæ*, and to the Linnæan class and order *Diandria Trigynia*.

BOTANICAL CHARACTERS.—A small shrubby climber; Leaves, alternate, petiolate, ovato-cordate; Flowers, small; closely set on the axillary spadices.

PROPERTIES.—Long pepper consists of the spadices which are gathered before they are fully ripe, and dried in the sun. As met with in commerce, they are of a grayish colour, hard, about an inch and a half in length, cylindrical, striated diagonally on their surface. They have a somewhat aromatic odour, and a very pungent spicy taste. The composition of long pepper is almost identical with that of black pepper, (See next article).

THERAPEUTICAL EFFECTS.—This pepper is somewhat more acrid than *piper nigrum*, but it may be employed in the same cases. Dose, gr. v. to ʒj.

PIPER NIGRUM, D. L. E. *Black pepper*. *Dried unripe berries (Berries, L.) of Piper nigrum*. A native of the continent of India, cultivated in the East and West Indian islands; it belongs to the Natural family *Piperaceæ*, and to the Linnæan class and order *Diandria Trigynia*.

BOTANICAL CHARACTERS.—Stem, shrubby, climbing, 8-12 feet long, jointed, dichotomous; Leaves, elliptical, acuminate, 5-7 nerved; Flowers, whitish, small, covering thickly a cylindrical, pendulous spadix; Fruit, distinct, at first green, changing as it ripens to bright red, and finally to black.

PHYSICAL PROPERTIES.—Before the berries on each spike have all changed to red, they are collected and dried in the sun, to constitute *black pepper*. *White pepper* is procured by soaking the fully ripe seeds in water, so as to enable the outer husks to be afterwards removed by rubbing. Black pepper consists of small spherical bodies, blackish and rough externally, whitish within, consisting of the outer wrinkled tegument, surrounding the hard smooth seed. It has a strong, peculiar aromatic odour, and a very pungent acrid taste. White pepper is the white nucleus, the outer black tegument having been removed.

CHEMICAL PROPERTIES.—Black pepper is composed of a neutral crystalline principle, which has been named *Piperin*, of a very acrid soft resin, balsamic volatile oil, extractive, gum, bassorin, starch, malic and tartaric acids, &c. The active principles are the *piperin*, resin, and volatile oil. Piperin may be readily prepared by Poutet's process as follows:—"Prepare an alcoholic extract of black pepper, digest in a solution of caustic potash, and agitate with water; filter and wash carefully with water what remains on the filter; dissolve it in warm alcohol, and crystallize by cooling." As usually met with, Piperin is a dark yellow, resinous looking substance, but it may be obtained in transparent, colourless, four-sided prisms; it is tasteless and inodorous, is insoluble in cold water, dissolves sparingly in boiling water or cold alcohol, but is very soluble in boiling alcohol; it melts at 212° ; it is a neutral principle; its composition, according to Wertheim and Rochleder, is $C^{70} H^{37} O^{10} N^2$. Black pepper imparts its properties partially to water, but more completely to alcohol.

THERAPEUTICAL EFFECTS.—Pepper is an acrid aromatic stimulant, in general use as a spice. It also possesses remarkable febrifuge properties, which reside in the piperin. This substance has been employed with much success in the treatment of ague, and has succeeded in many instances in effecting a cure in cases where quina and other remedies have failed. An interesting account of the employment of piperin in the treatment of intermittent fevers in the Island of Trinidad, by Dr. Hartle, has been published in the 55th vol. of the Edinburgh Medical Journal. As a stimulant, black pepper will be found a useful addition to bitters in atony of the digestive organs; externally it is used in the form of ointment to chronic diseases of the scalp, and as an adjunct to rubefacient cataplasms.

DOSE AND MODE OF ADMINISTRATION.—In substance, gr. v. to gr. xx.—*Piperin* is given in doses of gr. iij. to gr. v. every hour until gr. xvij. have been taken. It may be made into pill with mucilage or conserve of roses.—*Confectio Piperis nigri*, D. L. E. ("Take of black pepper, in fine powder; liquorice root, in powder, of each, half an ounce; refined sugar, one ounce; oil of fennel, half a fluid drachm; clarified honey, *by weight*, two ounces. Rub the dry substances together into a very fine powder, then add the honey and oil, and beat them into a uniform mass" D.—"Black pepper; and elecampane root (liquorice root, E.), of each, ℥j.; fennel seeds, ℥iij.; honey; and white sugar, of each, ℥ij.; rub the dry ingredients

together to a very fine powder," L. E. "Keep in a covered vessel, and whenever the confection is to be used, the honey being added, pound them until they are thoroughly incorporated," L. "Beat the whole into a uniform mass," E.). This preparation was introduced into the pharmacopœias as a substitute for a quack medicine called *Ward's paste for piles*. It will be found useful in hemorrhoids occurring in the weak and debilitated. Dose, ʒj. to ʒij.; to derive any benefit from its use it must be persevered in for two or three months.—*Rubefacient Cataplasm*, PARIS CODEX. (Barley meal, ʒiv.; vinegar, ʒj.; whites of three eggs; water, sufficient to make a cataplasm of a proper consistence; spread on linen, and sprinkle over it half an ounce each of black pepper and of fennel in fine powder). A speedy rubefacient.

INCOMPATIBLES.—Astringent vegetable preparations.

PORRUM, L. *The Leek. Bulb of Allium porrum*. A native of Egypt, cultivated in our gardens; it belongs to the Natural family *Liliaceæ*, and to the Linnæan class and order *Hexandria Monogynia*. The leek is never used in medicine, although retained in the London Pharmacopœia.

POTASSII SULPHURETUM, L. E. HEPAR SULPHURIS, D. *Sulphuret of Potassium. Liver of Sulphur*.

PREPARATION.—*Dublin*.—"Take of sublimed sulphur, four ounces; carbonate of potash from pearl-ash, first dried, and then reduced to powder, seven ounces. Mix these ingredients in a warm mortar, and having introduced them into a Hessian crucible, let this be heated, first gradually, until effervescence has ceased, and finally to low redness, so as to produce perfect fusion, and let its liquid contents be then poured into an iron cup, over which a second vessel should be immediately inverted, so as to exclude the air as completely as possible, while solidification is taking place. The solid product thus obtained should, when cold, be broken into fragments, and immediately enclosed in a green-glass bottle, furnished with an air-tight stopper." *London and Edinburgh*.—"Carbonate of potash, ʒiv.; sulphur, ʒj.; triturate them well together; and heat them in a covered crucible till they form a uniform fused mass." (Break to pieces, and keep in well closed bottles, E.).

PHYSICAL PROPERTIES.—This preparation occurs in various sized pieces, of a liver-brown colour, hard and fragile; inodorous when quite free from moisture, but emitting the disagreeable odour of sulphuretted hydrogen when moistened. It has an acrid, bitter, alkaline taste.

CHEMICAL PROPERTIES.—It is a mixture of 3 equivalents of tersulphuret of potassium, and 1 of sulphate of potash ($3 \text{KS}^3 + \text{KO}, \text{SO}^3$). By exposure to the air it deliquesces, attracts oxygen, and is all converted into sulphate of potash, becoming white and inodorous. It is readily soluble in water; the solution is of a yellow colour, and highly alkaline.

Adulterations.—This preparation is seldom met with in a pure state in the shops, in consequence of its undergoing decomposition so readily. The following are the tests of the London Pharmacopœia for its purity:—"Fresh broken it exhibits a brownish-yellow colour; dissolved in water, or in almost any acid, it exhales a smell of hydro-sulphurous acid; the aqueous solution is of a yellow colour; what is thrown down by acetate of lead is first red, and it afterwards becomes black."

THERAPEUTICAL EFFECTS.—In large doses, sulphuret of potassium acts as a powerful narcotico-acrid poison, a few drachms producing death with convulsions and tetanic spasms. In small doses it operates as a general stimulant, and as such, is employed on the continent in the advanced stages of hooping cough, in chronic rheumatism, in rebellious skin diseases, &c.; but in this country it is rarely used as an internal remedy. As a topical agent it is applied dissolved in water in the form of lotion or bath, or made into an ointment with axunge, in chronic cutaneous diseases principally those of a scaly character, and in the obstinate eruptions which affect the scalp.

DOSE AND MODE OF ADMINISTRATION.—For internal use, gr. iij. to gr. x. dissolved in some aromatic water and sweetened with syrup.—*Balneum Sulphuratum*, RAYER. (Sulphuret of potassium, ʒiv. ; tepid water, cong. xxx.; dissolve in wooden vessels). This may be employed as a local or general bath in skin diseases.—*Unguentum Potassii Sulphureti*, DEVERGIE. (Solution of sulphuret of potash, 12 parts; carbonate of potash, 8 parts; axunge, 30 parts; mix). For scabies and other cutaneous diseases.

INCOMPATIBLES.—The acids; and most metallic solutions.

In cases of poisoning with this substance, the best antidotes are solutions of chlorinated lime or chlorinated soda, with emollient drinks.

ROSMARINUS, D. L. E. *Rosemary.* *The tops of Rosmarinus officinalis.* A native of the south of Europe; belonging to the Natural family *Labiata* (*Lamiaceæ*, Lindley), and to the Linnæan class and order *Diandria Monogynia*.

BOTANICAL CHARACTERS.—A shrub, 6-8 feet high; Leaves, evergreen, sessile, lanceolate, revolute at the edge, glabrous on the upper surface, tomentose beneath; Flowers, pale-blue, in small spikes at the extremities of the young branches.

PROPERTIES.—The dried tops have an aromatic agreeable odour, somewhat resembling peppermint, and a warm, pungent, bitter taste. These properties depend chiefly on volatile oil, of which a pound of the fresh plant yields about one drachm. This oil, *Oleum Rosmarini*, D. L. E., is obtained by the usual process of distillation; it is limpid and colourless, with the odour and taste of the herb in an intense degree. Its density is 0.897; and its composition $\text{C}^{45} \text{H}^{38}$

O², (Kane). Rosemary tops communicate their odour to boiling water, but more completely to spirit.

Adulterations.—Oil of rosemary is often adulterated with oil of turpentine; the fraud may be detected by the odour when dropped on a heated spatula, or by its not being completely soluble in alcohol.

THERAPEUTICAL EFFECTS.—Rosemary possesses the aromatic stimulant properties of the Labiate plants before described, and may be used for the same purposes. The oil is frequently added to stimulating liniments, principally on account of its odour.

DOSE AND MODE OF ADMINISTRATION.—*Oleum Rosmarini*, D. L. E., min. ij. to min. v. dropped on sugar.—*Essentia Rosmarini*, D. (Take of oil of rosemary, one fluid ounce; rectified spirit, nine fluid ounces. Mix with agitation). Dose, min. x. to f3ss.—*Spiritus Rosmarini*, L. E.—("Oil of rosemary, 3ij.; rectified spirit, cong. j.; water, Oj.; mix, and with a slow fire distil a gallon," L.—"Rosemary, lbiss.; proceed as for spirit of lavender," E.). Seldom used internally. Dose, min. x. to min. xx.

SABADILLA. *Cevadilla* (described in the division *Anthelmintics*), is a powerful stimulant, and as such is used in the form of tincture as an external application in chronic rheumatism and paralysis, and over the region of the heart in hysterical and nervous palpitations. The powder of the seeds is employed to destroy pediculi; but its application is not unattended with danger, especially if the skin be broken. The active principle of cevadilla is *veratria*, as before mentioned, and it was principally as a means of affording that alkaloid, that it was introduced into the London and Edinburgh Pharmacopœias. The following are the processes directed to be followed:—

VERATRIA.—*London.*—"Cevadilla, bruised, lbij.; rectified spirit, cong. iij.; diluted sulphuric acid; solution of ammonia; purified animal charcoal; and magnesia, of each, a sufficiency; boil the cevadilla with a gallon of the spirit for an hour in a retort, to which a receiver is fitted. Pour off the liquor, and again boil what remains with another gallon of spirit, and the spirit recently distilled, and pour off the liquor; and let it be done a third time. Press the cevadilla, and let the spirit distil from the mixed and strained liquors. Evaporate what remains to the proper consistence of an extract. Boil this three or more times in water, to which a little diluted sulphuric acid is added, and with a gentle heat evaporate the mixed liquors to the proper consistence of a syrup. To this, when cold, put in the magnesia to saturation, frequently shaking them; then press and wash. Let this be done two or three times; then dry what remains, and digest with a gentle heat in spirit two or three times, and strain as often. Afterwards let the spirit distil. Boil the residue in water, to which a little sulphuric acid and animal charcoal are added, for a quarter of an hour, and strain. Lastly, the charcoal being thoroughly washed, evaporate the mixed liquors cautiously till they have the consistence of a syrup, and add to them as much ammonia as may be sufficient to throw down the Veratria. Wash and dry it." *Edinburgh.*—"Take any convenient quantity of cevadilla; pour boiling water over it in a covered vessel, and let it macerate for 24 hours; remove the cevadilla, squeeze and dry it thoroughly with a gentle heat. Beat it now in a mortar, and separate the seeds from the capsules by

brisk agitation in a deep narrow vessel. Grind the seeds in a coffee mill, and form them into a thick paste with-rectified spirit. Pack this firmly in a percolator, and pass rectified spirit through it till the spirit ceases to be coloured. Concentrate the spirituous solutions by distillation so long as no deposit forms; and pour the residuum, while hot, into 12 times its volume of cold water. Filter through calico, and wash the residuum on the filter so long as the washings precipitate with ammonia. Collect this precipitate on a filter, wash it slightly with cold water, and dry it, first by imbibition with filtering paper, and then in the vapour bath. A small additional quantity may be got by concentrating the filtered ammoniacal fluid, and allowing it to cool.—Veratria thus obtained is not pure, but sufficiently so for medical use. From this coloured substance it may be obtained white, but at considerable loss, by solution in very weak muriatic acid, decolorization with animal charcoal, and re-precipitation with ammonia."

PHYSICAL PROPERTIES.—Veratria is an uncrystallizable solid, pulverulent, as met with in commerce of a grayish-white colour, but it may be obtained perfectly white. It has an intensely acrid taste, and is said to be inodorous, but the smallest quantity applied to the lining membrane of the nostrils provokes violent sneezing.

CHEMICAL PROPERTIES.—It is composed of $C^{34} H^{21} N O^6$. It is not volatile nor altered by exposure to the air; it fuses at 230° , and cools into a transparent yellowish mass. It reacts alkaline, is nearly insoluble in cold water, requires 1000 parts of boiling water for its solution, is sparingly soluble in ether, but very soluble in alcohol. It forms salts with the acids, of which the hydrochlorate and the sulphate are alone crystallizable.

Adulterations.—Veratria very commonly contains lime; the adulteration may readily be detected by heating a small quantity in a platinum spoon, when, if it be pure, it will be completely dissipated.

THERAPEUTICAL EFFECTS.—In large doses, veratria operates as a powerful irritant poison, causing inflammation of the stomach and intestines when swallowed, and if applied to the surface of the body producing much irritation. Its action in small or medicinal doses does not appear to be well understood, but it would seem to act as a general stimulant, increased action of the intestines, the kidneys, and the capillaries of the skin being in general produced by its administration. Its use in medicine has hitherto been confined to neuralgic diseases, for the treatment of which it was first introduced as an external application by Dr. Turnbull. But the experience of numerous physicians who have tried it on his recommendation, not coinciding with his extravagant praises of the remedy, it has fallen into disrepute.

DOSE AND MODE OF ADMINISTRATION.—*Pulvis Sabadillæ*, gr. j. to gr. v.—*Tinctura Sabadillæ*, (Cevadilla seeds, freed from their capsules according to the directions of the *Edinburgh Pharmacopœia* for preparing *veratria*, and bruised, any quantity; rectified spirit as much as will cover them; macerate for ten days, express and filter). For external use as an embrocation.—*Extractum Sabadillæ*, (Evaporate the tincture with a gentle heat to a proper consistence). Dose, gr. $\frac{1}{8}$ th to gr. $\frac{1}{4}$ th gradually increased. This extract may be advantageously substituted for *veratria*.—*Veratria*, L. E. Dose, gr. 1-12th increased very cautiously. For an embrocation, 3j. of the alkaloid

may be dissolved in f̄3j. of rectified spirit.—*Unguentum Veratriæ*, TURNBULL. (Veratria, 3ss.; olive oil, 3j.; prepared lard, 3j.; mix). *Tinctura Veratriæ*, MAGENDIE, (Veratria, gr. iv.; rectified spirit, f̄3j.; mix). Dose, min. v. to min. xv.

In poisoning with veratria, the treatment is the same as in poisoning with Colchicum. (See page 95).

SERPENTARIA, D. L. E. *Virginian snake-root*. Root of *Aristolochia serpentaria*. A native of North America; belonging to the Natural family *Aristolochiaceæ*, and to the Linnæan class and order *Gynandria Hexandria*.

BOTANICAL CHARACTERS.—Stem, simple, flexuous, 8-10 inches high; Leaves, alternate, cordiform, acuminate, slightly pubescent; Flowers, solitary, reddish-brown.

PHYSICAL PROPERTIES.—As imported, serpentaria root consists of a tufted head with numerous attached radicles of a yellowish-brown colour externally, whitish within, with a short resinous fracture. The odour is aromatic, like that of valerian, and the taste warm and camphoraceous.

CHEMICAL PROPERTIES.—It consists of volatile oil, soft resin, bitter extractive, gum, albumen, starch, and some salts. It yields its properties to water and to alcohol.

THERAPEUTICAL EFFECTS.—Virginian snake-root, although at one time in great repute, is seldom employed in the present day. It appears to act as a general stimulant, and as such was used in typhoid fevers, in intermittents, in gangrenous affections, in amenorrhœa of the debilitated, &c. It is still very generally used in America.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to 3ss. —*Infusum Serpentariæ*, L. E. (Serpentaria, 3ss.; boiling (distilled, L.) water, Oj.; macerate (infuse, E.) for 4 hours in a (lightly, L.) covered vessel and strain). Dose, f̄3j. to f̄3ij. —*Tinctura Serpentariæ*, L. E. ("Serpentaria, bruised, 3iiiss.; proof spirit, Oij.; macerate for 14 days and filter," L.—"Serpentaria, in moderately fine powder, 3iiiss.; cochineal, bruised, 3j.; proof spirit, Oij.; proceed by percolation or digestion as for tincture of Cinchona," E). Dose, f̄3j. to f̄3ij.

INCOMPATIBLES.—Acetate of lead; and nitrate of silver.

SINAPIS ALBA, SEMINA. *White mustard seed* (described in the division *Emetics*), was at one time much employed as a stimulant in atonic forms of dyspepsia, but is very rarely used as such in the present day. It was taken in the dose of a dessert-spoonful three or four times a day, swallowed entire.

SODÆ CHLORINATÆ LIQUOR, D. L. *Solution of Chloride of Soda; Chlorinated Soda; Hypochlorite of Soda; Disinfecting liquor.*

PREPARATION.—*Dublin.*—"Take of chlorinated lime, half a pound; water, half a gallon; crystallized carbonate of soda of commerce, seven ounces. Blend well by trituration in a mortar the chlorinated lime with three pints of the water, and, having transferred the mixture to a stoppered bottle, let this be well shaken several times for the space of three hours. Pour out the contents of the bottle on a calico cloth, and to the filtered solution add the carbonate of soda dissolved in the remaining pint of water. Having stirred the mixture well for ten minutes, separate the liquid by a second filtration, and preserve it in a well-stopped bottle. The specific gravity of this liquid is 1034." *London.*—"Carbonate of soda, ℥bj.; distilled water, f̄xlviij.; chloride of sodium, ℥iv.; binoxide of manganese, ℥ij.; sulphuric acid, ℥iv.; dissolve the carbonate of soda in Oij. of water; then put the chloride of sodium and binoxide of manganese, rubbed to powder, into a retort; and add to them the sulphuric acid, previously mixed with f̄ziii. of water and cooled. Apply heat to the retort, and pass the chlorine first through f̄zv. of water, and afterwards into the solution of carbonate of soda above directed."

PHYSICAL PROPERTIES.—This solution is of a yellow colour, with a strong odour of chlorine, and a sharp astringent taste.

CHEMICAL PROPERTIES.—Its precise composition has not been ascertained, but it is generally supposed to be a mixture of hypochlorite of soda, bicarbonate of soda, and chloride of sodium. Exposed to the air, chlorine escapes, and crystals of the carbonate of soda are gradually deposited. By evaporation with a gentle heat crystals are obtained, which by solution in water afford a liquid with the same properties. It bleaches vegetable colours, first acting as an alkali on them. This solution may be distinguished from solution of chlorinated lime by its not precipitating with the oxalates or carbonates.

THERAPEUTICAL EFFECTS.—This solution agrees precisely in its properties with hypochlorite of lime, and is employed for the same purposes (see page 336). For destroying noxious effluvia it is to be preferred to that substance as the salt, *chloride of sodium*, which is left, does not deliquesce; while chloride of calcium is very deliquescent. The dose for internal use is min. xx. to min. xxx. in a sufficiency of water, which may be sweetened with syrup.

SODII CHLORIDUM, D. L. SODÆ MURIAS, E. *Common salt; Chloride of sodium; Muriate of soda; (Impure commercial chloride of sodium, E.).*

PREPARATION.—Chloride of sodium is an article of the *Materia Medica* in the three British Pharmacopœias. On the large scale it is procured by dissolving and crystallizing rock-salt, or by evaporating sea water or the water of some mineral springs, in which it is contained in large quantities. The Edinburgh College has given a formula for purifying commercial salt:—*Sodæ murias purum, E.* "Take any convenient quantity of muriate of soda, dissolve it in boiling water; filter the solution and boil it down over the fire, skimming off the crystals which form, wash the crystals quickly with cold water, and dry them."

PHYSICAL PROPERTIES.—Chloride of sodium crystallizes in transparent, colourless cubes; it has an agreeable saline taste, but no odour. Its density is 2·17.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of sodium, and 1 of chlorine, (Na Cl). It contains no water of crystallization, but heated it decrepitates owing to some water being mechanically lodged between the tables of the crystals. Exposed to a bright red heat it fuses, and at a white heat volatilizes unchanged. It is permanent in the air when quite pure; it is equally soluble in cold and boiling water, requiring 2·7 parts of water for its solution. It is insoluble in absolute alcohol, but rectified spirit dissolves it slightly. It is neutral to test paper.

Adulterations.—As met with in this country, common salt does not contain any impurity which can interfere with its use for general or pharmaceutical purposes. Owing to the presence of chloride of magnesium, it is frequently slightly deliquescent. The tests for its impurity, as given by the Edinburgh College, are as follows:—"A solution is not precipitated by solution of carbonate of ammonia followed by solution of phosphate of soda. A solution of gr. ix. in distilled water is not entirely precipitated by a solution of gr. xxvj. of nitrate of silver."

THERAPEUTICAL EFFECTS.—Chloride of sodium taken internally in moderate quantities acts as a mild stimulant to the digestive organs, promoting the assimilation of the food; on which account, as well as in consequence of its agreeable flavour, it is used generally by man in all parts of the world, as an adjunct to nearly every substance employed by him as an article of diet. It proves serviceable to digestion inasmuch as it prevents the generation of intestinal worms in the alimentary canal, to which those who use little or no salt with their food are very subject. In somewhat larger doses it acts as a mild cathartic, forming a principal ingredient in many mineral waters, in which it augments the operation of the other laxative salts. It acts as an emetic in doses of one or two ounces; and in one instance, a pound of it taken at once occasioned death with all the symptoms of irritant poisoning. Applied to the surface of the body, it is a local stimulant, producing the effects of a rubefacient. Chloride of sodium is not much employed in medicine; as an emetic, it may be administered in narcotic poisoning in the absence of other substances; as a cathartic it is not given alone, but is advantageously combined with the other saline cathartics, (see page 107); as an anthelmintic, a strong solution has been injected into the rectum to destroy ascarides; as a general stimulant, it is used in some forms of dyspepsia, and in scrofulous and other glandular enlargements; and as a topical agent it is added to both hot and cold baths, when they are intended to act as local stimulants. In America a saturated solution of common salt is employed with much success as a lotion in chronic granular ophthalmia. In cholera and some other diseases in which the saline constituents of the blood are deficient, a solution consisting of ʒij. of the muriate, and ʒij. of car-

bonate of soda dissolved in f̄3l̄x. of water, has been injected into the veins, but the results were not more successful than those which followed other methods of treatment.

DOSE AND MODE OF ADMINISTRATION.—As a stimulant, gr. x. to 3j. As an emetic, 3j. to 3ij. dissolved in Oj. of water. For baths, lbj. to lbij. may be added to from cong. iij. to cong. v. of either cold or warm water.

INCOMPATIBLES.—Nitrate of silver.

STAPHISAGRIA, L. E. *Stavesacre*. *Seeds of Delphinium staphisagria*. A native of the south of Europe; belonging to the Natural family *Ranunculaceæ*, and to the Linnæan class and order *Polyandria Trigynia*.

BOTANICAL CHARACTERS.—Stem, cylindrical, branching, downy, about 2 feet high. Leaves, alternate, broad, palmated, smooth on the upper, downy on the under surface; Flowers, purple, in lax racemes.

PROPERTIES.—Stavesacre seeds are about the size of a small pea, irregularly triangular, compressed, dark brown; they have a faint unpleasant odour; and a very acrid bitter taste. Their acridity depends upon an uncrystallizable alkaloid, *delphinia*, which constitutes more than 8 per cent. of the seed. They yield their active properties to boiling water, but more completely to alcohol or to vinegar.

THERAPEUTICAL EFFECTS.—Stavesacre is a powerful irritant, at one time used in medicine as an emetic and anthelmintic, but employed at present only for the destruction of pediculi. An ointment prepared by mixing the powdered seeds with four times their weight of lard, or an infusion of the bruised seeds in vinegar may be used for this purpose. *Delphinia* has been employed by Dr. Turnbull of London in rheumatic and neuralgic affections. The dose of it is from 1-12th to 1-4th of a grain frequently repeated.

In cases of poisoning with stavesacre or its alkaloid the treatment is the same as in poisoning with *Colchicum*, (see page 95).

SULPHUR (described in the division *Cathartics*), in small doses frequently repeated, acts as a stimulant to the cutaneous vessels, and is therefore administered with much benefit in chronic diseases of the skin, particularly scabies, for which, however, it is more generally employed as an external application. The curative powers of sulphur in this disease appear to be specific, but it has been recently stated that it acts as a poison to a small insect (*Sarcoptes hominis* of Raspail), which has been discovered to exist in the pustules of itch, and by which it is believed by many that the disease is produced. Whatever may be its *modus operandi*, sulphur is

undoubtedly more generally successful in the cure of scabies than any other substance which has hitherto been employed; it is used on the continent, especially in France, with much effect, combined with carbonate of potash in the proportion of 2 parts of sulphur and 1 of carbonate of potash to 8 parts of lard; when frictions are carefully made over the entire body with this sulfuro-alkaline ointment, the disease is cured on the third or fourth day; the friction is made only once daily, being preceded each time by a warm bath. Sulphur is also used as an external application in many other cutaneous eruptions, particularly in lepra and psoriasis, in which in the form of vapour, *sulphur-vapour-bath*, its use is often productive of the best results. The dose of sulphur as a stimulant is from gr. x. to gr. xxx.; it may be given in the form of electuary made with treacle or with syrup. For external application either of the following ointments may be used.—*Unguentum Sulphuris*, D. L. E. ("Prepared lard, ℥iv. (3iv. E.); sulphur (sublimed, D.), ℥j. (3j. E.); (mix well by trituration, D.). (Rub the sulphur to fine powder, and mix well with lard, E.)" D. E.—"Sulphur, 3iij.; lard, ℥ss.; oil of bergamot, min. xx.; mix," L.).—*Unguentum Sulphuris compositum*, L. (Sulphur, ℥ss.; white hellebore, powdered, 3ij.; nitrate of potash, 3j.; soft soap, ℥ss.; lard, ℥iiss.; oil of bergamot, min. xxx.; mix). This latter ointment often proves very irritating.

TEREBINTHINÆ OLEUM. *Oil of turpentine* (described in the division *Anthelmintics*), administered in small but frequently repeated doses, acts as a general stimulant to the system, and as such has been employed in the low stages of typhoid and common continued fevers, in chronic rheumatism, in neuralgia, in hemorrhages from the mucous surfaces dependant on an atonic state of the vessels, to facilitate the passage of biliary calculi, in sciatica, and to prevent the access of the fit in epilepsy. Its local stimulant powers have been already considered, (see page 235); made into an ointment with three parts of prepared lard, I have found it a useful application in some very chronic cases of furfuraceous eruptions on the scalp. The four following substances nearly allied to turpentine, and obtained from the same or nearly related coniferous trees, are employed as topical stimulants in the forms of ointments, plasters, or cerates.

RESINA, D. L. E. *Resin of Pinus sylvestris*, D.—*The residue of turpentine after the oil is distilled*, L.—*Residue of the distillation of the turpentines from various species of Pinus and Abies*, E.—Rosin or Resin, is met with in two forms, *Yellow resin (Resina flava)*, and *Brown resin or Colophony (Resina nigra seu Colophonium)*. The former is obtained when the application of heat is stopped before all the volatile oil is expelled from the pine turpentines; the latter when the process is continued until all the oil is distilled. Resin is

a semi-transparent, very brittle solid, varying in colour from pale yellow to brownish-black. It has a faint turpentine odour, but is quite tasteless; it consists of two resins which have been named *Pinic* and *Sylvic acids*; the composition of both is the same, viz: $C^{40}H^{30}O^4$. In medicine, yellow resin is alone employed; it is used partly as a local stimulant, but principally to communicate a certain degree of consistency or adhesiveness to ointments, plasters, &c.—*Unguentum Resinæ*, D. (Take of resin, in coarse powder, half a pound; yellow wax, four ounces; prepared lard, one pound. Melt them together with a gentle heat, strain the mixture, while hot, through flannel, and stir constantly until it concretes).—*Ceratum Resinæ*, L. (Resin; and wax, of each, ℥ij.; olive oil, f̄xxvj. melt the resin and wax together with a slow fire, then add the oil, and press the cerate while hot through a linen cloth).—*Unguentum Resinosum*, E. (Resin, 3v.; axunge, 3vij.; bees'-wax, 3ij.; melt them together with a gentle heat, and then stir the mixture briskly while it cools and concretes). These ointments, commonly known under the name of *Basilicon ointment*, are employed as stimulating applications to foul and indolent ulcers.

PIX LIQUIDA, D. L. E. *Tar*. From various species of *Pinus*, and of *Abies*, E.—*Prepared liquid resin of Pinus sylvestris*, D. L. Tar is prepared in the countries bordering on the Gulph of Bothnia, from various trees of the fir tribe, by a species of *destillatio per descensum*. The old wood and roots are closely packed into the upper part of a pit dug in the earth, in the bottom of which an iron pan is fixed; the timber is ignited and covered with sods of earth to prevent the escape of the volatile parts. The tar gradually exudes and flows into the iron pan, from whence it is conducted by a pipe into barrels, each of which holds $31\frac{1}{2}$ gallons.

Tar is a thick, tenacious, opaque liquid, of a dark brown, almost black colour, with a strong peculiar odour, and a bitter disagreeable taste. It dries so slowly, even when exposed to the air, that it retains its liquid character for an almost indefinite period. It is composed of various resins, modified oil of turpentine, acetic acid, and water; it communicates both odour and taste to water, which dissolves out its oil and acid; and it is soluble in alcohol, ether, and the fixed and volatile oils.

Tar was formerly used in medicine in chronic catarrhal complaints, and in the form of vapour its inhalation was highly recommended by Sir Alexander Crichton in phthisis. In the present day, however, it is only used as a local stimulant in chronic cutaneous diseases. *Aqua Picis liquidæ*, (Tar, ℥ij.; water, cong. j.; mix, stirring with a stick for a quarter of an hour; as soon as the tar has subsided, strain the liquor, and keep it in well closed jars). *Tar-water*, the above formula for which has been omitted from the last edition of the Dublin pharmacopœia, was first introduced by Bishop Berkeley as a remedy for diseases of the chest and of the kidneys; the dose was from Oj. to Oij. daily. Its use is completely obsolete in the present day.—*Unguentum Picis liquidæ*, D. L. E. ("Take of tar,

half a pint; yellow wax, four ounces: melt the wax with a gentle heat, then add the tar, and stir the mixture constantly until it concretes," D.—"Tar; and mutton suet, of each, ℥j.; melt them together, and press through a linen cloth," L.—"Tar, 3v.; bees' wax, 3ij.; melt the wax with a gentle heat, add the tar, and stir the mixture briskly as it concretes on cooling," E.). Tar ointment is often used with benefit as a stimulant in chronic diseases of the skin.—By distilling tar with water, a mixture of impure oil of turpentine, a *pyrogenous* oil, and some *pyretin* is procured; this liquid, under the name of *oil of pitch* (*Huile de Cade* of the French), has been recently used on the continent as a local application in many cutaneous diseases, especially obstinate cases of lichen, herpes, and eczema. Inunctions are made with it twice a day. Some of the French pharmacologists restrict the term, *huile de cade* (*oleum cadinum*) to a tarry oil obtained by the dry distillation of the wood of the *Juniperus oxycedrus*.

PIX NIGRA, L. PIX ARIDA, E. *The prepared solid resin of Pinus sylvestris*, L. *Pitch from various species of Pinus and Abies*, E. This is a black solid matter left after the oil, the acid, and water are expelled by heat from tar. It is only used externally, the ointment being employed for the same purposes as tar-ointment.—*Unguentum Picis nigrae*, L. (Black pitch; wax; and resin, of each, 3ix.; olive oil, f3xvj.; melt them together and press through a linen cloth).

PIX BURGUNDICA, D. E. PIX ABIETINA, L. *Concrete resinous exudation (probably in a great measure, E.) from Abies excelsa*, D. E.—*The prepared resin of Pinus abies*, L.—*Burgundy Pitch*. This substance is supposed by the London College to be procured by fusion and expression from common Frankincense, *Thus*, D., *Abietis resina*, L., but as met with in the shops it is usually a mixture of common turpentine, resin, and palm oil. It is in soft masses of a pale yellow colour, with a terebinthinate odour and taste; when pure, according to Guibourt, it has a strong, agreeable, balsamic odour, and a sweet perfumed taste. It is only used externally as a topical stimulant.—*Emplastrum Picis*, L. E. ("Burgundy pitch, ℥j.; resin of the spruce fir, ℥j.; resin; and wax, of each, 3iv.; expressed oil of nutmegs, 3j.; olive oil; and water, of each, f3ij.; add first the resin of the spruce fir, then the oil of nutmegs, the olive oil, and the water, to the pitch, resin, and wax melted together. Lastly, mix them all and boil down to a proper consistence," L.—"Burgundy pitch, ℥iiss.; resin; and bees' wax, of each, 3ij.; oil of mace, 3ss.; olive oil, f3j.; water, f3j.; liquefy the pitch, resin, and wax with a gentle heat, add the other articles, mix them well together, and boil till the mixture acquires the proper consistence," E.). A stimulating plaster applied to the chest in chronic catarrhal complaints, and over the seat of the pain in local neuralgia and in chronic rheumatism.—*Thus*, Frankincense, is not used in medicine.

VERATRUM ALBUM. *White Hellebore* (described in the division

Errhines), is a powerful stimulant, causing irritation and even inflammation of the stomach, when taken in not very large doses. It was at one time much used in nervous affections, and in chronic cutaneous diseases both externally and internally; its employment in gout has been replaced by colchicum; and its application for the destruction of pediculi by stavesacre; so that at present it is scarcely ever put to any use: the dose of the powder is from gr. ij. to. gr. v. cautiously increased.—*Vinum Veratri*, L. (White hellebore, sliced, ʒviij.; sherry wine, Oij.; macerate for 14 days and strain). Dose, min. v. to min. x.—*Decoctum Veratri*, L. (White hellebore, bruised, 3x.; distilled water, Oij.; rectified spirit, f3ij.; boil the hellebore in the water down to Oj., and when it has cooled add the spirit; then press and strain). Only employed externally in chronic cutaneous diseases, and to destroy pediculi.—*Unguentum Veratri*, L. (White hellebore, powdered, ʒij.; prepared lard, lbss.; oil of lemons, min. xx.; make into an ointment). Used for the same purposes as the decoction, and as a substitute for sulphur ointment in the cure of scabies. In poisoning with white hellebore, the same treatment should be used as in poisoning with Colchicum, (see page 95).

VINUM ALBUM HISPANICUM, D. VINUM XERICUM, L. VINUM ALBUM, E. *Spanish white wine. Sherry.* It would be quite foreign to the scope of this work to enter into any detailed account of the mode of preparation, or peculiar properties of the almost innumerable varieties of wine that are met with. The observations to be made will therefore refer to wines generally.

PROPERTIES.—Wine is a transparent liquid, of a yellowish, reddish-yellow, or deep red colour. It has a peculiar, agreeable odour (*bouquet*), and taste, (both odour and taste vary exceedingly). It consists of water, alcohol, tartaric and acetic acids, bitartrate of potash, tartrate of lime, extractive matter, colouring matter, vegeto-animal matter, and a peculiar volatile oil or rather ether, which has been named *œnanthic ether*. In the white wines, tannin and colouring matter are in less proportion than in the red wines. The quantity of alcohol which is present in wine varies exceedingly, some of the weaker German wines containing only 6·90 per cent. by weight of alcohol, while strong Port wine contains 17·10 per cent. (Christison).

Adulterations.—The only adulterations of wine, which are of importance with reference to its medicinal employment, are the additions of lead or of lime which are sometimes used for the purpose of correcting acescency. The former is detected by the black precipitate which is produced on the addition of sulphuretted-hydrogen. The latter by the white precipitate formed with solution of oxalate of ammonia.

THERAPEUTICAL EFFECTS.—Wine is an excellent stimulant in the advanced stages of typhus fevers, being generally better suited for this purpose than any other alcoholic liquid. Its use is particularly

called for where delirium is present with much sinking of the vital powers, and when the nervous symptoms as singultus, subsultus tendinum, and sleeplessness unaccompanied by any local inflammation or congestion predominate. The use of wine in fever is not contraindicated, as has been stated by many, when the tongue is dry, black, or red, when the eyes are red or suffused, or when there is morbid heat of the surface: as wine often proves of great benefit when one or even more of these symptoms are present. Wine is also given with much advantage in convalescence from acute diseases, in chronic debility, especially when it is caused by excessive discharges, in mortification unaccompanied by inflammatory symptoms, in erysipelas, and in tetanus. When any local congestion or inflammation is present or may be apprehended, the administration of wine in the treatment of disease is for the most part calculated to do mischief. Although Sherry is the only wine officinal in the pharmacopœias, Port is generally employed in medicine; Claret and Madeira are also used. When its greater strength and its astringency are not objectionable, Port wine is always to be preferred. Madeira and Claret are often inadmissible on account of their acidity; but when this is not the case, the former is well adapted for debilitated or broken down habits; the latter when the employment of stronger wines might prove injurious. Sherry is chiefly employed in the preparation of the medicated wines, but Cape wine, on account of its cheapness, is usually substituted by druggists; in a dietetical point of view, Sherry is the wine in most general use, and the one calculated to agree best with most constitutions.

DOSE AND MODE OF ADMINISTRATION.—The quantity of wine which should be administered in the treatment of disease varies so exceedingly in different cases, that it is almost impossible to lay down any general rule. From $\text{f}\text{3viiij}$. to $\text{f}\text{3xx}$. is the quantity usually given in the 24 hours, and it should be borne in mind that there is a great tolerance of wine in disease. As an injection for the radical cure of hydrocele, two thirds of Port wine are diluted with one-third of water.

ZINGIBER, D. L. E. *Ginger. Rhizome of Zingiber officinale, D. L. E.* Supposed to be originally a native of the East Indies, at present cultivated in most tropical countries. It belongs to the Natural family *Zingiberaceæ*, and to the Linnæan class and order *Monandria Monogynia*.

BOTANICAL CHARACTERS.—Stem, annual, two to three feet high, cylindrical, invested with the smooth sheaths of the leaves; Leaves, linear-lanceolate, smooth; Flowers, yellowish with purple lips, in cone-shaped, radical or rarely terminal, solitary spikes; Fruit, a 3-celled capsule.

PREPARATION.—The rhizome or root-stalk, which is biennial, is dug up at the commencement of the second year of its growth, cleaned, scalded with boiling water, and dried in the sun, when it constitutes what is called black ginger; to prepare white ginger, the rhizome is not scalded, but the outer coats are removed by scraping.

PHYSICAL PROPERTIES.—As met with in commerce, ginger is in various sized, flattened pieces, knotty, palmated, hard and compact. *Black ginger* is of a dirty gray colour, and rugose externally, yellowish brown and stringy within. *White ginger* is whitish or pale yellow externally, pale buff within, with a somewhat starchy texture. The finer sorts of ginger are firm, sound and heavy, and have a peculiar, rich, aromatic odour, and a warm very pungent taste.

CHEMICAL PROPERTIES.—Ginger contains a pale yellow volatile oil, an acrid soft resin, a sub-resin, gum, starch, extractive, nitrogenous matter, &c. Its properties which depend chiefly on the volatile oil and soft resin, are extracted by water and by alcohol.

THERAPEUTICAL EFFECTS.—Ginger is a powerful aromatic stimulant; when taken in moderation it increases remarkably the tone of the digestive organs, and consequently is much employed as a condiment. In medicine it is principally used to give warmth and flavour to other drugs. Ginger acts as a special stimulant to the urino-genital mucous membrane, its use should therefore be avoided by persons who have any tendency to stricture of the urethra. As a local stimulant it is chewed in paralysis of the tongue, relaxation of the uvula, &c.; the powder made into a paste with boiling water and spread on linen is a speedy rubefacient.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. v. to gr. xxx.—*Syrupus Zingiberis*, D. L. E. ("Take of tincture of ginger, one fluid ounce; simple syrup, seven fluid ounces: mix with agitation," D.—"Ginger (sliced, L.), 3iiss.; boiling water, Oj.; pure sugar, 1biiss.; macerate (infuse, E.) the ginger in the water for 4 hours, strain, add the sugar and make into a syrup," L.E). Dose, f3j. to f3ss.—*Tinctura Zingiberis*, D. L. E. (Ginger, in coarse powder (sliced, L.), 3viiij. (3iiss. L. E.); rectified spirit, Oij.; macerate for 14 (7, E.) days (strain, express, D.) and filter. "Proceed by percolation or digestion as for tincture of cinchona," E.). Dose of the *Dublin* tincture, min. xx. to f3j., of the *London* and *Edinburgh*, f3j. to f3ij.—*Essence of Ginger* commonly kept in the shops is nothing more than a very strong tincture.

CHAPTER XX.

SPECIAL STIMULANTS.

ALL who aim at the discovery of a truly scientific classification of medicines object to the use of the terms *specifics* and *alteratives*, inasmuch as they are only employed to define remediate modes of action with the rationale of which we are unacquainted. That this is true I fully admit, but the practical utility of these appellations is so great and so generally understood, that until medical science has arrived at a much more advanced stage of progress than it has as yet attained, it would, I think, be foolish to discard them for any theoretical ideas. I have merely ventured to unite both in the same division under the above title. In this division of medicinal agents, then, I include those substances which by a *special* or peculiar action on individual organs, or on the system generally, produce remediate effects. Those of them which give rise to some alteration, not well understood, in the nature or quality of vital action, are called *alteratives*; while those which possess a special influence in the treatment of certain diseases are denominated *specifics*. Many alteratives and specifics have already been described in other classes of medicines, but the articles contained in this chapter cannot, with a regard to accuracy or convenience in arrangement, be included in any of them; inasmuch as the nature of the primary influence which some of these agents exercise on the animal economy has not been satisfactorily ascertained; and others possess a peculiar influence over *certain organs* or *diseases* chiefly:—as examples of the former I may refer to Mercury, Iodine, and Gold; of the latter to Nux-vomica, Cubebs, and Copaiba.

AMMONIÆ ARSENIAS. *Arseniate of ammonia.*

PREPARATION.—This compound is readily prepared by saturating a solution of arsenic acid with ammonia, taking care that the alkali be in excess, evaporating and crystallizing.

PROPERTIES.—It crystallizes in rhomboidal prisms; its composition being, $2 \text{H}^3\text{N As}^2\text{O}^5 + \text{HO}$. It is a neutral salt, and is soluble in water and alcohol.

THERAPEUTICAL EFFECTS.—Arseniate of ammonia is not employed in this country. It is used in France as an internal remedy in the treatment of obstinate cutaneous diseases, particularly those of a

scaly character. The preparation that is employed being the following solution first proposed by Biett:—*Solution of Arseniate of Ammonia*, (Arseniate of ammonia, gr. iss.; distilled water, f3iij.; spirit of angelica, f3vj.; mix). Dose, f3j. to f3iij. in some aromatic water.

ARSENICI IODIDUM. *Iodide of Arsenic. Teriodide of Arsenic.*

PREPARATION.—Arsenic, in fine powder, 3 parts; iodine, 10 parts; water 100 parts; digest together so long as the odour of iodine is perceived, and evaporate quickly to dryness.

PROPERTIES.—This is an orange-red powder, odourless and tasteless. Exposed to the air it rapidly undergoes decomposition, iodine escaping and metallic arsenic being left; it is volatilized by heat. Iodide of arsenic is soluble in boiling alcohol, from which, as the alcohol cools, it is deposited in bright crystals. It is decomposed by water into free iodine, hydriodic and arsenious acids. Its composition is As I^3 .

Adulterations.—As met with in the shops, this preparation frequently contains uncombined metallic arsenic, which may be distinguished by the naked eye.

THERAPEUTICAL EFFECTS.—Iodide of arsenic is employed internally with much benefit in the treatment of chronic cutaneous diseases, particularly lepra, psoriasis, and porrigo; in the latter of which I have used it extensively, and with great success even in very inveterate cases. Its use must be continued for some time after the disease is cured, in order to prevent a relapse. In some cases in which the medicine had been taken daily for five or six weeks, the patients complained of head-ache and dryness of the mouth and fauces, which quickly disappeared on intermitting the use of the remedy for a few days. It is administered with much benefit in the treatment of cancer, and, in conjunction with the use of an ointment containing iodide of lead as an external application, has produced excellent effects in the hands of many practitioners. On the Continent it has been also employed as a topical application in the form of ointment, but its external use is not unattended with danger.

DOSE AND MODE OF ADMINISTRATION.—It should be at first given in doses of 1-10th of a grain, which may be cautiously increased to 1-4th of a grain three times a day. It is best administered in the form of pill made with conserve of roses, or with hard manna.

INCOMPATIBLES.—Acids; acidulous and metallic salts.

ARSENICI ET HYDRARGYRI HYDRIODATIS LIQUOR, D. *Liquor of Hydriodate of Arsenic and Mercury.*

PREPARATION.—Take of pure arsenic, in fine powder, six grains; pure mercury, sixteen grains; pure iodine, fifty grains and a half; alcohol, half a fluid drachm; distilled water, nine ounces, or a sufficient quantity: rub together the arsenic, mercury, iodine, and spirit, until a dry mass is obtained, and, having triturated eight ounces of the water with this in successive portions, let the whole be transferred to a flask, and heated until it begins to boil. When cooled and filtered, let as much distilled water be added to it as will make the bulk of the solution exactly eight fluid ounces and six drachms.

PROPERTIES.—This solution is of a pale greenish-yellow colour, odourless, with rather a styptic taste. Each fʒj. contains about $\frac{1}{16}$ th of a grain of oxide of arsenic, $\frac{1}{4}$ th of a grain of oxide of mercury, and $\frac{1}{2}$ ths of a grain of iodine in the state of hydriodic acid, in chemical combination.

THERAPEUTICAL EFFECTS.—This compound has been found particularly useful in the treatment of chronic cutaneous diseases, especially those of a scaly character, or in which the scalp is the seat of the disease. It has been also employed with benefit in venereal eruptions, both papular and scaly, in lupus, in impetigo, in pityriasis, &c. Its efficacy in these obstinate affections is now so well established, that it has been admitted into the last edition of the Dublin Pharmacopœia. For further information on this subject, I must refer to Mr. Donovan's excellent memoirs in the 16th, 18th, and 22nd Vols. of the *Dublin Journal of Medical Science*. In my own practice, however, I have found it to fail in effecting a cure in many cases, and in others I have seen it produce injurious constitutional effects, when the disease for which it was administered was invariably aggravated. This I have been inclined to attribute to the presence of the mercury in it, and I have therefore latterly substituted for it a compound in which the mercury is replaced by iodide of potassium (see page 428).

DOSE AND MODE OF ADMINISTRATION.—Min. x. to min. xxx. three times a day. It should be administered largely diluted with distilled water. The external use of the medicine in the form of lotion (ʒj. to fʒj. of distilled water) has been combined with its internal administration.

INCOMPATIBLES.—Acids; most salts; opium; and the salts of morphia.

AURUM. Gold. This metal is not contained in any of the British Pharmacopœias, nor are any of its preparations employed in this country in the practice of medicine. They are, however, frequently administered on the continent, and their virtues highly spoken of in some diseases. Although it has been stated by many that metallic gold is perfectly inert, a powder of gold (*Pulvis auri*) is officinal in the Parisian Codex. It is prepared in several ways: one of the simplest and best is to rub any quantity of leaf-gold with 7 or 8 times its weight of sulphate of potash in an earthenware or glass mortar, as long as any fragments of the leaves are visible; and

then to wash well with warm water, which dissolves out the sulphate of potash, and leaves the gold in the form of a fine powder. Powder of gold is said to be a much more effectual remedy both in primary and secondary syphilis than mercury; it is peculiarly applicable to those cases in which mercury is found to aggravate the disease, or in which the symptoms depend on the excessive use of preparations of that metal; in some instances it produces increased flow of saliva, without affecting the teeth and gums however as that metal does. It has been also used in chronic cutaneous diseases, in scrofulous affections, and in glandular enlargements. Powder of gold may be given internally in doses of gr. $\frac{1}{4}$ or gr. $\frac{1}{2}$ gradually increased to gr. iij.; it may be made into pill with conserve of roses. It is, however, generally introduced into the system by way of friction on the gums and tongue, or applied on a portion of the skin deprived of the epidermis; it is also used as a local application to chancres in their primary stage. For these purposes either of the following preparations may be employed.—*Syrup of Gold*, (Powder of gold, gr. xxiv.; simple syrup, f3j.; mix).—*Ointment of Gold*, (Powder of gold, gr. j.; axunge, gr. xv).

AURI IODIDUM. *Iodide of Gold.*

PREPARATION.—(French Codex). “Pour a solution of chloride of gold into a solution of hydriodate of potash, as long as any precipitate falls; filter, and wash the powder well with alcohol, to dissolve out the excess of iodine; and then dry it.”

PROPERTIES.—Iodide of gold is a greenish-yellow powder, insoluble in cold, and very sparingly soluble in boiling water. Exposed to a heat of about 300° F. the iodine is driven off, and metallic gold left. It is composed of 2 equivalents of gold and 1 of iodine, Au^2I , (Graham).

THERAPEUTICAL EFFECTS.—This preparation is a very active poison, more so than corrosive sublimate; it is employed in venereal and scrofulous affections internally, in doses of 1-15th to 1-10th of a grain, in the form of powder, or of pill, combined with powdered gum arabic, as it is decomposed by most vegetable substances.

AURI PERCHLORIDUM. *Perchloride of Gold; Sesquichloride of Gold.*

PREPARATION.—(French Codex). “Pure laminated gold; and nitric acid, of each, one part; hydrochloric acid, two parts; dissolve the gold in the mixed acids with a gentle heat, evaporate till the solution begins to emit chlorine; and set it aside to crystallize by cooling.”

PROPERTIES.—Sesquichloride of gold is in the form of needle-shaped, prismatic crystals, of a golden-yellow colour; it is inodorous, but has a very styptic, disagreeable taste. In dry air it remains unaltered, but deliquesces rapidly in damp air. Water, alcohol and ether dissolve this salt; the solution is of a yellow colour, and is acid

to litmus paper; exposed to the light, although kept in stoppered bottles, it is decomposed, and gold deposited on its surface. Sesquichloride of gold is composed of 2 equivalents of gold, and 3 of chlorine, $\text{Au}^2 \text{Cl}^3$ (Graham).

THERAPEUTICAL EFFECTS.—This salt is the most generally employed of the preparations of gold. It is exceedingly active; so small a dose as 1-15th of a grain has, in the hands of Cullerier, at the second dose produced gastric irritation, dryness of the tongue, redness of the throat, colic, and diarrhoea. It is employed it is said with much success in the treatment of syphilitic diseases, both primary and secondary, particularly in cases where mercurial preparations fail to do good. It has also been used in scrofulous and herpetic affections, in cancer, &c. As an external application, it has been employed as a caustic to open cancer, to lupus, and to obstinate syphilitic ulcerations.

DOSE AND MODE OF ADMINISTRATION.—It may be given in doses of 1-20th to 1-15th of a grain, once a day, made into pills with starch, or dissolved in distilled water. The same quantity intimately mixed with gr. v. of starch may be applied by friction to the gums and tongue.—*Caustic of Recamier*, (Chloride of gold, gr. vj.; dilute nitrohydrochloric acid, fʒj.; dissolve). Applied by means of a piece of lint dipped in it; the eschar which it forms falls off in a few days, and leaves a clean, healthy surface underneath.—*Sodii Auroterchloridum*, FRENCH CODEX. (Chloride of gold, 85 parts; chloride of sodium, 16 parts; dissolve in a small quantity of distilled water; concentrate with a gentle heat, till a pellicle begins to form on the surface; then set aside to crystallize). Chloride of gold and sodium crystallizes in long four-sided prisms, of an orange-yellow colour; it is employed in the same manner, and in the same doses as sesquichloride of gold. It is less expensive, and nearly, if not quite as active. An ointment of it, prepared by mixing, with trituration, 1-10th of a grain with gr. xxxvj. of axunge, may be applied to the skin denuded of the epidermis.

INCOMPATIBLES.—Most metals, and their salts; the alkalies; sugar; gum; charcoal; tannin; extractive.

In poisoning with chloride of gold, or with chloride of gold and sodium, the same treatment should be adopted as in poisoning with corrosive sublimate.

AURI PEROXYDUM. *Peroxide of Gold; Sesquioxide of Gold; Auric Acid.*

PREPARATION.—(French Codex). “Chloride of gold, 1 part; calcined magnesia, 4 parts; water, 40 parts; boil gently for a short time; wash the precipitate repeatedly with water until the washings no longer precipitate with solution of nitrate of silver; and then digest in cold diluted nitric acid, to dissolve out the magnesia; dry the residuum without heat and in the dark.”

PROPERTIES.—Auric acid is of a chestnut brown colour, becoming yellowish when moistened. It is insoluble in water; is rapidly

decomposed by exposure to light or heat; and combines with alkalis to form salts. It is composed of 2 equivalents of gold, and 3 of oxygen, $\text{Au}^2 \text{O}^3$ (Berzelius).

THERAPEUTICAL EFFECTS.—It is used in the same cases as the other preparations of this metal, and has been especially recommended by M. Legrand for the treatment of scrofulous diseases of the bones. Dose, 1-10th of a grain to 1-4th of a grain.—*Pills of oxide of Gold*, MAGENDIE. (Oxide of gold, gr. vj.; extract of mezereon, 3ij.; divide into 60 pills). Dose, 2 to 10 daily.

BROMINEUM, L.—*Bromine*. This elementary fluid body was originally introduced into the London Pharmacopœia, merely as being employed in the preparation of *Bromide of potassium*. But within the last few years it has been used in medicine as a substitute for iodine, in consequence of the high price of that substance.

PREPARATION.—It is obtained from sea water, and from the waters of many mineral springs, in which it exists in the forms of bromide of magnesium and bromide of sodium, by first saturating with chlorine gas to separate it from the base, adding ether which dissolves out the bromine, and then separating from the ether by means of solution of caustic potash which combines with the bromine forming bromide of potassium; from this salt it is obtained by a process similar to that for procuring iodine. It has been latterly prepared in large quantities in the United States, having been discovered in many of the brine springs throughout the state of New York.

PHYSICAL PROPERTIES.—At ordinary temperatures, bromine is a heavy, dark reddish-brown liquid, of a hyacinth-red colour when viewed by transmitted light. Its odour resembles that of chlorine, but is much stronger and more disagreeable, whence its name (*Βρῶμος*, fetid). Its taste is very acrid. Specific gravity 2.966.

CHEMICAL PROPERTIES.—Bromine is an elementary substance. It is scarcely soluble in water, and its solubility is not sensibly augmented by heat. It is rather more soluble in alcohol and still more so in ether. It is very volatile, boiling at the temperature of 116° . Bromine bleaches vegetable colours like chlorine. It combines with most metals, forming bromides with them.

THERAPEUTICAL EFFECTS.—As remarked above, it is as a substitute for iodine that bromine is employed in medicine; with which it appears to be nearly if not quite identical in action.

DOSE AND MODE OF ADMINISTRATION.—It is seldom used in the uncombined state, but the following solution has been employed by M. Pourche as a substitute for tincture of iodine:—Bromine, one part; distilled water, forty parts; dissolve. Dose, min. v. to min. vj. in some aqueous vehicle three or four times a day. For external use a preparation four times the strength of this may be employed. The *bromide of potassium* and *bromide of iron* will be described hereafter. The other combinations of bromine which are used in medicine are the following:—*Bromide of barium*, which is soluble in water, is given in doses of one to five grains three times a day: the

ointment is prepared by combining it with lard in the proportion of one part to ten. *Bromide of calcium* is prescribed in the form of pill made with conserve of roses; the dose of it is from three to ten grains. Two *bromides of mercury* have been used: the first, a sub-bromide, is a white insoluble powder; the dose of it is one to two grains daily: the second, a bromide, is fusible and volatile, and soluble both in water and alcohol; its dose is 1-16th of a grain, gradually increased to 1-4th of a grain daily.

COPAIBA, L. E. COPAIFERA OFFICINALIS, BALSAMUM, D. *Copaiva*. *Balsam of Copaiva*. Various species of the *Copaifera* yield the *Copaiva balsam of commerce*, D.—*Fluid resinous exudation of various species of Copaifera*, E.—of *Copaifera langsdorffii*, L. The various species of the genus *Copaifera* from which the balsam is obtained are natives of South America, and the West Indian Islands; they belong to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL CHARACTERS.—Trees, 20-35 feet high; Leaves, abruptly pinnate; Leaflets, coriaceous, somewhat unequal, ovate; Flowers, in panicles.

PREPARATION.—The liquid resin exists in great abundance in the trees; it is procured by making deep incisions into the stem in the hot summer months, when in some instances 12 pounds of juice will exude in three hours. Many trees yield copaiva twice or three times in the year.

PHYSICAL PROPERTIES.—*Copaiva*, or as it is commonly but improperly called *Balsam of Copaiva* (an error propagated by the Dublin College in their last pharmacopœia), is a transparent, oily liquid, of a pale-yellow colour,—inferior kinds are dark yellow. It has a strong, peculiar, and to most persons very disagreeable odour, and a bitter, acrid, very permanent and exceedingly unpleasant taste. Specific gravity from .950 to .966, becoming denser by age.

CHEMICAL PROPERTIES.—Fresh copaiva is composed of 41 per cent. of volatile oil, 51.38 per cent. of hard yellow resin (*copahuvic acid*), 2.18 of brown soft resin, and 5.44 of water and loss (Gerber). Exposed to the air it gradually thickens, and becomes darker coloured. It is insoluble in water, but is completely soluble in alcohol, ether, and the fixed and volatile oils. It dissolves magnesia and its carbonate, and forms with them after 4 or 5 hours a translucent mass, sufficiently consistent to form into pills. The volatile oil of copaiva (*copaibæ oleum*), which is officinal in the *Edinburgh Pharmacopœia*, is obtained by distillation with water. It is transparent and colourless, has a density of 0.878, boils at 473°, and is soluble in alcohol and ether. Its composition is isomeric with that of oil of turpentine, being $C^{10} H^8$. *Copahuvic acid* is composed of $C^{40} H^{32} O^4$; it is left when the volatile oil is distilled; in consequence of its retaining a small portion of which, it possesses a faint copaiva odour.

Adulterations.—Copaiva is very much adulterated, so much so that it is difficult to meet with a perfectly pure specimen. The im-

purities usually found in it are oil of turpentine, and more recently, as pointed out by Mr. Redwood, the distilled oil of the *Gurjun balsam*—the produce of some species of *Dipterocarpus*, or some fixed oil as castor-oil, poppy-seed oil, rape-oil, &c. Oil of turpentine, or any other volatile oil, is readily discovered by the odour, when it is dropped on a heated spatula. The presence of any fixed oil may be detected by the greasy arcola which surrounds the spot of resin left, on gently evaporating, over the flame of a lamp, a drop or two of the suspected balsam on unsized paper. The tests of the *Edinburgh Pharmacopœia* for its purity are as follows:—"Transparent; free of turpentine odour when heated; soluble in two parts of alcohol; it dissolves a fourth of its weight of carbonate of magnesia, with the aid of a gentle heat, and continues translucent." To these we may add Planche's test for the usual adulteration, that with castor-oil, "pure balsam agitated with solution of ammonia, of the density .965, becomes clear and transparent in a few moments; but remains turbid if castor-oil be present." These tests are, however, not to be depended on; the only satisfactory means of ascertaining the goodness of copaiva, as has been lately suggested by Mr. Redwood, being, the obtaining the oil by distillation:—pure specimens yield nearly 60 per cent., while those of inferior quality do not afford more than 30.

THERAPEUTICAL EFFECTS.—Copaiva is a special stimulant to the mucous membranes, its action being particularly directed to the bladder and urethra. In many instances its administration is followed by a cutaneous eruption which closely resembles urticaria; and when given in large doses it produces vomiting and purging. The principal use of copaiva is in the treatment of gonorrhœa, for which it is undoubtedly the best remedy with which we are acquainted. The practice is still followed by many, of not administering copaiva in this disease, until all inflammatory symptoms are subdued by antiphlogistic treatment. But the majority of surgeons in the present day administer it in the very earliest stage, and with the best results; indeed the earlier it is given, the more speedy and the more effectual will be the cure. In the treatment of gonorrhœa, the use of copaiva should always be continued for 8 or 10 days after the discharge has completely ceased. Copaiva has also been employed with benefit in leucorrhœa, in chronic catarrh of the bladder, in the chronic bronchitis of the old or debilitated, especially when the bronchial secretion is profuse, and in chronic dysentery.

DOSE AND MODE OF ADMINISTRATION.—Min. x. to f3j. In consequence of its very nauseous taste, a great many ways have been proposed for administering copaiva; but it appears to me to act with greater certainty, and to cause less disgust when given floating on a wine-glassful of water to which a drachm of some aromatic tincture, as of tincture of orange-peel, has been added. It is sometimes given in the form of pill prepared by boiling the balsam with calcined magnesia or with hydrate of lime; a sufficient degree of consistency will be obtained in 4 or 5 hours with the latter, while from 12 to 15

hours will be required to produce the same result with the former. The process of M. Thierry is as follows:—Rub together in a marble mortar 15 parts of *pure* copaiva, and 1 part of hydrate of lime (or 2 parts of calcined magnesia); put the mixture over a water bath, and stir from time to time till the lime has disappeared; keep up the fire for 4 hours, or for 15 hours if magnesia be used. The mass may be divided into gr. vj. pills, of which from 6 to 12 may be taken two or three times daily. More recently copaiva has been administered enclosed in gelatine capsules, for preparing which the following method is followed:—the polished bulbous extremities of iron rods are oiled with almond oil, and then dipped into a warm concentrated aqueous solution of ordinary or bleached gelatine, which is of the consistence of thick honey; they are then rotated quickly till the gelatine congeals, when the capsules are to be removed gently with three fingers, and laid on a loose hair-sieve to dry; when perfectly dry they are filled to the margin by means of a glass drop tube with copaiva, and the mouth closed with a little of the warm solution of gelatine (*Steege*). *Gelatine capsules of copaiva* contain each about gr. x. of balsam; but a spurious sort is very commonly sold in which the capsules are filled with train oil. The nostrum known as *Frank's specific solution* may be very closely imitated as follows:—Copaiva, 2 parts; liquor potassæ *vel* sodæ, 3 parts; distilled water, 7 parts; boil for a quarter of an hour, then add spirit of nitric ether, 1 part; allow it to stand a few hours, and draw off the clear liquor by means of an orifice in the lower part of the vessel. The dose of this mixture is fʒij. three times a day. Copaiba is also administered in the form of enema, the bulk of which should be small, from fʒj. to fʒij. of copaiba to fʒvj. of decoction of barley.—*Oleum Copaibæ*, E. The oil is preferred by many to any other preparation of copaiva, but I have frequently seen it fail; the dose is from min. xv. to min. xxx. dropped on sugar.—*Resina Copaibæ*; this preparation is very properly discarded from practice; the dose of it is from gr. x. to ʒss.

CUBEBA, E. CUBEBA OFFICINALIS, D. PIPER CUBEBA, L. *Cubebs*. Fruit (*Berries*, D.) of *Cubeba officinalis*, D.—of *Piper cubeba*, L. E. A native of Java and the Prince of Wales' Island; belonging to the Natural family *Piperacæ*, and to the Linnæan class and order *Diandria Trigynia*.

BOTANICAL CHARACTERS.—Stem, sarmentaceous, articulated, terete; Leaves, petiolated, oval, coriaceous; Flowers, on an elongated, pendant spadix; Fruit, a pedunculated small berry, the peduncles are nearly equal to the petiole.

PHYSICAL PROPERTIES.—Cubebs are the dried unripe berries; they are about the size of black pepper, wrinkled on the surface, brownish externally, whitish and oily within. They have a small portion of the peduncle attached, whence the name *piper caudatum*

has been applied to them. Their odour is strong, peculiar, aromatic; their taste warm, pungent and very spicy.

CHEMICAL PROPERTIES.—Cubebs are composed of 2·5 per cent. of green volatile oil, 1 per cent. of yellow volatile oil, 4·5 of a peculiar principle named *Cubebin* (which is probably identical with *Piperin*), 1·5 of balsamic resin and wax, lignin, &c. The volatile oil, *Oleum Cubebæ*, D. E., is obtained by the usual process of distillation with water; it is of a pale greenish yellow colour, transparent and limpid, with the peculiar odour and taste of cubebs. Its density is 0·929; and its composition $C^{15}H^{12}$, being isomeric with oil of turpentine. Cubebs yield their properties very partially to boiling water, but completely to alcohol.

THERAPEUTICAL EFFECTS.—Cubebs possess the stimulant and carminative properties of the other peppers; but they also exercise a specific influence on the urinary organs, indicated by their power in arresting urethral discharges. They are only employed in medicine in the treatment of gonorrhœa, for which they are held by many to be equal if not superior to copaiva. We are perfectly ignorant as to the manner in which cubebs cure gonorrhœa; but their specific influence appears to be exercised only in the early stages of the disease, so that they usually fail to prove beneficial when the discharge has existed for any time; they should therefore be administered on its first appearance, when if the running be not checked in from three to five days, their continued use will in most instances do more harm than good. Cubebs have also been employed in leucorrhœa and in catarrh of the bladder with doubtful benefit.

DOSE AND MODE OF ADMINISTRATION.—In powder, which is the best form, ʒj. to ʒiij. three times a day. The powder should be always prepared fresh for use, as owing to the volatility of its oil, it deteriorates rapidly. The larger the dose in which cubebs are given, the more certain will be their effect; they may be administered suspended in milk or in water.—*Oleum Cubebæ*, D. E.; Dose, min. x. to min. xxx. dropped on sugar; it is not so certain in its effects as the powder.—*Tinctura Cubebæ*, D. L. (Cubebs, bruised, ʒv.; rectified spirit, Oij.; macerate for 14 days (strain, express, D.) and filter). This tincture is generally added to mixtures containing copaiva. Dose, fʒj. to fʒij.

HYDRARGYRUM, D. L. E. Mercury: Quicksilver. Mercury is met with in the metallic state in the quicksilver mines of South America. It is principally brought to England from Almaden in Spain, from Idria in Illyria, and from Moschel in Bavaria, where it is extracted from the native sulphuret, *Cinnabar*.

PREPARATION.—It is procured from cinnabar either by distilling with caustic lime or by roasting the ore. As met with in commerce, it is in general sufficiently pure for medical purposes, but in the Dublin Pharmacopœia a process is contained for purifying it:—**HYDRARGYRUM PURUM, D.**, “Take of quicksilver of commerce, three pounds;

pure muriatic acid, half a fluid ounce; distilled water, two ounces. Having introduced the quicksilver into a small glass retort, over the body of which a hood of sheet iron is supported, let the heat of a gas-lamp be applied until two-thirds of the metal has distilled over. Boil this for a few minutes with the acid and water, and having, by repeated affusion of distilled water, and decantation, removed the entire of the acid, let the metal be poured into a capsule, and dried by the application of heat."

PHYSICAL PROPERTIES.—At ordinary temperatures, mercury is liquid; it has a silver-white colour with a bluish shade, and is very brilliant. Its specific gravity is 13·56 when liquid, and 14·0 when solid.

CHEMICAL PROPERTIES.—Mercury is a simple metallic substance, its symbol being Hg. It boils at 662°, and solidifies at 39° or 40° below zero, crystallizing in regular octohedrons; exposed to the air at the usual temperature, it remains unaltered if pure, but otherwise the surface soon tarnishes. Agitated for some time in contact with the air, it is converted into a greyish-black powder which was formerly called *Æthiops per se*; this, according to some chemists, is a suboxide of mercury, but according to others it is the metal in a state of very minute division. Mercury combines with most metals to form *amalgams*; the smallest trace of it communicates a white stain to gold or silver.

Adulterations.—Tests for the purity of metallic mercury are given by the London and Edinburgh Colleges.—"Totally dissipated in vapour by heat. Dissolved by diluted nitric acid; when boiled in hydrochloric acid, the acid when cold is not coloured, nor is any thing precipitated from it by hydro-sulphuric acid. Its specific gravity is 13·5," L.—"Entirely sublimed by heat; a globule moved along a sheet of paper leaves no trail; pure sulphuric acid agitated with it evaporates when heated without leaving any residuum," E. By the application of these tests, the usual metallic adulterations with tin, lead, zinc, or bismuth, are readily detected.

THERAPEUTICAL EFFECTS.—As long as mercury remains in the state of metal, it is now generally agreed that it does not exercise any influence on the human body, and that in all cases in which its specific action is manifested, it must be first converted into oxides or salts. The inhalation of mercurial vapours, (which, as has been recently proved, contain some oxide), for any lengthened period, produces a singular train of symptoms which principally affect the nervous system; the most remarkable of these is the *shaking palsy* or *tremblement métallique*, in which the muscles of the arms become so unsteady, as almost to place them completely out of the control of the individual. This affection is not uncommon amongst the workers in quicksilver mines, gilders, and others whose trade exposes them to the vapour of this metal. To cure the disease, the patient must be removed from the contaminated atmosphere which has produced it, and get nourishing diet, with tonics, more particularly preparations of iron. The shower-bath and magnetic electricity (see page 352), are powerful auxiliaries in restoring the nerves to a healthy state.

The effects on the human body of the different preparations of mer-

cury which are used in medicine are very complex, and as they are possessed in common by most of the mercurial compounds, they will be most conveniently considered here.

The *topical* effects of the preparations of mercury are generally somewhat irritant, *remotely* they act as special stimulants both to secretion and excretion. The most remarkable effect of mercury is its action on the salivary glands, *salivation*. When this medicine is introduced into the system in such a manner as to excite this peculiar state, it at first produces increased vascular action, shortly followed by a metallic or brassy taste, in the mouth, and a slight mercurial fetor of the breath; the gums become somewhat swollen and spongy at their edges, soon presenting a slight degree of ulceration; the lining membrane of the cheeks and sometimes also of the palate, acquires a leaden hue, and is swollen; and an increased flow of saliva takes place, accompanied by pain in the teeth on the least pressure. If these symptoms be allowed to advance, or if more mercury be administered, the cheeks, the tongue, and the throat swell and ulcerate, and a copious flow of saliva sometimes amounting to several pints in the twenty-four hours, is induced; this excessive salivation is accompanied by slow fever and rapid emaciation. The quantity of a mercurial preparation required, or the length of time for which it must be administered, to produce the above effects, varies exceedingly in different constitutions and under different circumstances. Individuals are sometimes met with, in whom, almost the minutest dose of any preparation of mercury will produce most violent salivation; while on the other hand, some persons appear to be totally insensible to this peculiar operation of the drug.

It has been held by many that the production of this specific effect of mercury is necessary to the development of its curative powers, and most unquestionably it occurs, that in most instances its sanatory influence in the treatment of diseases is contemporaneous with its action on the salivary glands. Great attention, however, must always be paid not to allow salivation to proceed too far, as a frightful train of symptoms, in many instances followed by death itself, is the usual result of excessive salivation. In the early stage, mercurialism is most decidedly checked by the use of active or nauseating doses of tartar emetic, and by keeping the surface of the body warm, and the face and neck cool.

The effects of mercury on the system are sometimes accompanied by a peculiarly alarming state, first described by Mr. Pearson, under the name of "*mercurial erethism*"; "it is characterised by great depression of strength, a sense of anxiety about the præcordia, frequent sighing, trembling partial or universal, a small quick and sometimes intermitting pulse, occasional vomiting, a pale contracted countenance, a sense of coldness, but the tongue is seldom furred, nor are the vital or natural functions much disordered." When these or the greater part of these symptoms are present, a sudden and violent exertion of the animal powers, such as rising suddenly

in bed, will often prove fatal. These symptoms are best combated by an immediate discontinuance in the use of mercury, the exhibition of cordials in small but frequent doses, and rest in the horizontal posture, with free exposure to the open air both by day and night.

The use of this mineral is also frequently attended with, or followed by several forms of diseases of the skin: of these the most important is *mercurial eczema*, which often occurs when only a very small quantity of a mercurial preparation has been taken. In its milder forms, it resembles the acute stage of *eczema rubrum*, arising from other causes; but it more frequently assumes a much more severe character, when it is ushered in by fever, difficult respiration, dry cough, and tightness across the chest, with a general smarting and burning feel of the skin over the whole body. These symptoms are soon followed by an eruption of minute vesicles, which break and discharge a very fetid fluid. As the disease increases in severity, the eruption extends over the face and the whole of the body, which become covered with incrustations; the fever assumes a typhoid type, the difficulty of breathing increases and is accompanied by bloody expectoration, spots of purpura appear, and death ensues, preceded by delirium or convulsions. On the first appearance of this eruption, the use of mercury ought to be immediately relinquished, and the accompanying symptoms treated by the means appropriate for the individual case, any account of which would be quite foreign to the scope of this work.

The therapeutical powers of mercury, and for which it is employed in the treatment of disease, depend on its properties as an *anti-phlogistic*, an *anti-syphilitic*, an *alterative*, and a *deobstruent*. An account of the most important diseases for which mercurials are administered is subjoined, but as they are so numerous they can only be very shortly alluded to. In *inflammatory diseases*, both acute and chronic, mercury is very much employed; it is peculiarly adapted for those forms of inflammation which frequently result in the effusion of coagulable lymph or of serum; amongst which may be enumerated croup, laryngitis, pleuritis, pneumonia, pericarditis, peritonitis (particularly that form of it which attacks lying-in-women), meningitis, &c. In all these diseases the previous use of blood-letting is attended with advantage, and the mercurial—calomel is the preparation generally used, should be introduced into the system as quickly as possible, so as just to *touch the gums*, but the production of free salivation usually proves injurious. In *iritis*, mercury is the chief remedy on which reliance is to be placed. In *hepatitis*, in *nephritis*, in *metritis*, and in *synovitis*, its use is productive of decided benefit. In *epidemic dysentery*, and in *pestilential cholera*, especially when occurring in warm climates, very large doses of calomel given at the very onset of the disease, will frequently cut it short; as this power, however, is possessed by calomel alone, we shall again refer to it. In the fevers of our climate, unless when inflammation of some particular organ is present, the use of mercury is injudicious; but in the fevers of warm climates it is for

the most part found to be serviceable. The curative powers of mercury in inflammatory diseases depend much on the character of the inflammation; thus, while it generally acts beneficially in simple acute inflammations, and in those of a syphilitic character, it is less serviceable in rheumatic, and seldom admissible in scrofulous inflammation.

The history of the *syphilitic disease* is closely connected with that of mercury, as for many hundred years it was supposed to be completely incurable without the use of this medicine. Of late, however, it has been established on very satisfactory evidence that most, if not all, cases of syphilis may be cured without mercury, by simple local and general treatment. Nevertheless, when judiciously employed, so as to produce a moderate ptyalism, mercury has been found by the most experienced surgeons to cure the disease more rapidly, and to afford greater security against relapses.

In chronic enlargements of the abdominal viscera unconnected with malignant disease, in glandular swellings, in morbid depositions, in adhesions of parts consequent on inflammation, where hemorrhage has taken place into the substance of the brain or of the lungs, and for the removal of effusions into any of the shut cavities of the body, mercury, administered so as to produce its specific action, generally proves very efficacious. In paralysis, especially when dependant on derangements of the brain and nervous system, its use is often attended with decided benefit. In many other diseases of the nervous system, as in hydrocephalus, in mania, in epilepsy, in chorea, in tetanus, in hysteria, in tic douloureux, &c., mercury has also been employed in many instances with advantage.

DOSE AND MODE OF ADMINISTRATION—To remove obstruction of the bowels, metallic mercury has been given in doses of one or two pounds, followed by active cathartics, but the absurdity of the principle on which it was administered, that of acting as a mechanical agent, is too manifest to require any observation. As before remarked, the specific action of mercury is not manifested so long as it retains the metallic state; but as there are some general rules which apply equally to the different mercurial preparations employed to produce salivation, they will be most conveniently considered in this place. And first, with respect to preparatory treatment: it will always be advisable, in acute inflammations, to subdue the severity of the symptoms by antiphlogistic measures; and in broken down or enfeebled constitutions, to strengthen the system by the use of tonics, previously to the administration of mercury. Owing to the neglect of these precautions, it frequently occurs that the physician is baffled in his attempts to produce ptyalism, or when produced, it is excessive, and with great difficulty controlled. "I am strongly of opinion," says the late Mr. Colles, in his valuable work on the Venereal Disease, "that the want of a due preparatory process has of late years contributed to bring this valuable remedy into much disrepute." With respect to the general treatment during a mercurial course, the most important points to be observed are, the neces-

sity of rest and quietness of both mind and body, the maintaining the temperature of the surface uniform by warm clothing, and the use of a moderate diet, free from all stimulating food and drink.

In the following preparations, a portion of the mercury is converted into the sub-oxide, but the greater part of it is merely mechanically reduced to a finely divided state.—*Pilule Hydrargyri*, D. L. E. (See page 102). Dose, gr. iij. to gr. v., night and morning; if it should occasion irritation, a fourth of a grain of opium may be added to each pill.—*Hydrargyrum cum Cretâ*, D. L. E. (See page 101). This is the mildest preparation of mercury; as an alterative the dose is from gr. v. to gr. xxx. It is seldom given with the intention of producing salivation, except in very weak or enfeebled habits; these observations apply also to the following preparation:—*Hydrargyrum cum Magnesiâ*, D. (See page 102).—*Unguentum Hydrargyri*, D. E. *Unguentum Hydrargyri fortius*, L. ("Pure mercury; prepared lard, of each, ℥j.; rub them together until metallic globules cease to be visible to the naked eye," D.—"Mercury, ℥j.; lard, 3xxij.; suet, 3j.; triturate the mercury with the suet and a little of the lard till globules are no longer visible, then add the rest of the lard and mix the whole thoroughly," L. E.—"This ointment is not well prepared so long as metallic globules may be seen in it with a magnifier of four powers," E.).—*Unguentum Hydrargyri mitius*, L. E. ("Mix ℥j. of the stronger ointment of mercury with ℥j. of lard," L.—"The stronger ointment diluted with twice or thrice its weight of axunge," E.). Mercurial ointment is very frequently employed for introducing mercury into the system; and for this purpose, ʒss. to 3j. of the stronger ointment may be rubbed carefully into the inside of the thighs night and morning. Should it be desirable to produce speedy salivation, it may be used as a dressing to blistered surfaces, and 3j. or 3ij. placed in each axilla. When employed to promote the dispersion of glandular enlargements, it should be rubbed over the seat of the disease. It is also smeared over the inflamed surface in phlegmonous erysipelas,—a practice often productive of very beneficial results. The milder ointment is generally used as a dressing to venereal sores.—*Ceratum Hydrargyri compositum*, L. (Stronger ointment of mercury; and soap cerate, of each, ʒiv.; camphor, 3j.; rub together until they are incorporated). Employed to promote the dispersion of indolent tumours, and as an application to chronic enlargements of the joints.—*Linimentum Hydrargyri compositum*, D. L. ("Take of ointment of mercury, one ounce; camphor liniment; solution of ammonia, of each, one fluid ounce. Melt the ointment in the liniment, with a gentle heat, then add the ammonia, and mix them with agitation," D.—"Stronger mercurial ointment; and lard, of each, ʒiv.; camphor, 3j.; rectified spirit, f3j.; solution of ammonia, f3iv.; rub the camphor first with the spirit, then with the lard and ointment of mercury; lastly, the solution of ammonia being gradually poured in, mix them all," L.). A stimulating liniment, applied to indolent tumours, &c., 3j. contains nearly gr. x. of mercury. It produces

salivation very speedily.—*Emplastrum Hydrargyri*, D. L. E. (“Take of pure mercury, six ounces; resin, two ounces; oil of turpentine, one fluid ounce; litharge plaster, twelve ounces. Dissolve the resin in the turpentine with the aid of heat, add the mercury, and rub them together until metallic globules cease to be visible, and the mixture assumes a dark gray colour; then add the litharge plaster, previously melted, and stir the mixture constantly until it stiffens on cooling,” D.—“Mercury, 3iij.; lead plaster, lbj.; olive oil, f3j.; sulphur, gr. viij.; add the sulphur gradually to the heated oil, stirring constantly with a spatula till they unite; afterwards rub the mercury with them until globules are no longer visible; then gradually add the plaster of lead melted with a slow fire, and mix them all,” L.—“Mercury, 3iij.; litharge plaster, 3vj.; olive oil, f3ix.; resin, 3j.; melt the resin and oil, let them cool, add the mercury, triturate till the globules disappear, add the plaster previously melted, and mix the whole well,” E.). Applied as a resolvent in glandular enlargements, and over the region of the liver in chronic induration of that organ.—*Emplastrum Ammoniaci cum Hydrargyro*, D. L. E. (“Take of ammoniac plaster, four ounces; mercurial plaster, eight ounces. Melt them together by means of a steam or water bath, and stir constantly, until the mixture stiffens on cooling,” D.—“Ammoniac, lbj.; mercury, 3iij.; olive oil, f3j.; sulphur, gr. viij.; proceed as for *Emplastrum Hydrargyri*, L., substituting the ammoniac for the lead plaster,” L. E.). Applied to indolent buboes, enlarged glands, especially when of a syphilitic origin, and to venereal nodes, and as a resolvent in many diseases.—*Mercurial Soap*, HEBERT. (Take of mercury, and nitric acid, of each, 3iv.; put these ingredients into a matrass capable of holding twice the above quantity, and stir the mixture from time to time until the solution shall have been effected at the ordinary temperature of the atmosphere. Introduce into a porcelain capsule, lbj. 3j. of calf’s fat, melt this by the heat of a water bath, and then add the solution of mercury, stirring the ingredients together till they have acquired an adhesive consistence. To every 3v. of the ointment thus formed add f3ij. of caustic solution of soda, (density 1·33), and rub them together on a porphyry slab until combination be effected). The soap thus formed is perfectly soluble in water. It is employed on the continent with much benefit in the treatment of those cutaneous affections, in which preparations of mercury usually prove useful; it is applied to the parts either alone or dissolved in water; care must be taken to suspend its use if it be found to produce irritation or inflammation.

HYDRARGYRI BICHLORIDUM, L. SUBLIMATUM CORROSIVUM, D. CORROSIVUS SUBLIMATUS, E. *Bichloride of Mercury; Corrosive Sublimate; Chloride of Mercury.*

PREPARATION.—*Dublin*.—“Take of sulphate of mercury, ten pounds; dried chlo-

ride of sodium, five pounds. Reduce each salt to a fine powder, and, having mixed them carefully by trituration in a mortar, let the mixture be introduced into an iron pot lined with clay, and by a regulated heat applied through the intervention of sand, let the corrosive sublimate be sublimed into an earthen head placed over the pot, and connected to it by means of lute. The product should be preserved in an opaque bottle." *London*.—"Mercury, lbij. ; sulphuric acid, lbij. ; chloride of sodium, lbiss. ; boil the mercury with the sulphuric acid in a proper vessel till the bipsulphate of mercury remains dry ; rub this when it is cold with the chloride of sodium in an earthen mortar, then sublime with a heat gradually raised." *Edinburgh*.—"Mercury, ℥iv. ; sulphuric acid, ℥ij. ; nitric acid, ℥ss. ; muriate of soda, ℥ij. ; mix the acids, dissolve the mercury in them with the aid of a moderate heat ; raise the heat so as to obtain a dry salt ; triturate this well with the muriate of soda, sublime in a proper apparatus."

PHYSICAL PROPERTIES.—Corrosive sublimate is met with in the form of a white, semi-transparent, crystalline mass, or as a white powder ; by careful sublimation it may be obtained in regular crystals, the primary form of which is the right rhombic prism. It is inodorous but has an intensely acrid and disagreeable taste. Its specific gravity is 5.4 (Kane).

CHEMICAL PROPERTIES.—Although this salt is called a bichloride in the *London Pharmacopœia*, more recent chemical investigations have shown it to be a simple chloride, its composition being Hg. Cl . It is permanent in the air ; it fuses at 509° , and boils at 563° ; its vapour is colourless, but very acrid. It is soluble in 16 parts of cold and in 3 parts of boiling water, in $2\frac{1}{3}$ parts of alcohol and in 3 parts of ether. Its solubility is much increased by the addition of hydrochloric acid or of the alkaline muriates. A solution of corrosive sublimate gives a yellow precipitate with hydrates of potash, soda, or lime ; a red precipitate with the alkaline mono-carbonates ; a scarlet with iodide of potassium ; and a black with sulphuretted hydrogen. Dropped on gold it does not tarnish it, but if the moistened surface be touched with a piece of iron or zinc, mercury is immediately precipitated, and leaves a white stain on the gold, which may be removed by heat. Corrosive sublimate may be removed from its solution in water, by agitation with ether.

Adulterations.—Corrosive sublimate seldom contains any impurity ; its subliming without any residuum, and its complete and easy solubility in sulphuric ether, the tests given by the *Edinburgh College*, are sufficient to detect any adulteration.

THERAPEUTICAL EFFECTS.—Corrosive sublimate is a powerful irritant poison, a few grains producing death preceded by rapid and excessive inflammation of the digestive tube, with great derangement of the nervous system and coma. In small repeated doses, it possesses the usual action of a mercurial, but salivation is more slowly produced by it, and its effects are more decidedly *alterative* than those of any other preparation of the metal. It is consequently much employed in the treatment of secondary syphilis by those who believe that ptyalism is not essential to the curative effects of mercury. Corrosive sublimate is also employed with much benefit in chronic cutaneous diseases, in chronic rheumatism, in arthritis, periostitis, &c. ; in which cases it is advantageously combined with a

vegetable diaphoretic or tonic. Dissolved in water it forms a most useful lotion in psoriasis and lepra, and an excellent collyrium in the milder forms of ophthalmia.

DOSE AND MODE OF ADMINISTRATION.—1-12th to 1-8th of a grain made into pill with crumb of bread, twice or three times daily.—*Pilulæ Corrosivi Sublimati*, DZONDI. (Corrosive sublimate, gr. xij.; dissolve in distilled water, a sufficiency; and add crumb of bread; and white sugar, of each, a sufficiency to make 240 pills). Each of these pills contains a 20th of a grain of sublimate; Dose, 4 daily, to be increased gradually until 30 are taken at a dose. For a lotion or collyrium, gr. ss. to gr. j. may be dissolved in fʒj. of distilled water, or the following preparation may be employed.—*Liquor Hydrargyri Bichloridi*, L. (Bichloride of mercury, and hydrochlorate of ammonia, of each, gr. x.; distilled water, Oj.; dissolve together in the water). Dose, for internal use, fʒss. to fʒij.

INCOMPATIBLES.—The alkalies and their carbonates; lime, and its carbonate; tartar emetic; nitrate of silver; acetate of lead, iodide of potassium; albumen; soaps; almond mixture; decoction of bark, &c.

In cases of poisoning with corrosive sublimate, albumen, as white of egg, is the best antidote; it should not be given, however, in too great quantity, as the compound formed is soluble in an excess of albumen: the yolk of egg has been recently proved to be an equally, if not more, efficacious antidote: in their absence, wheaten flour, milk, protochloride of tin, or iron filings may be used. Miahle has proposed the hydrated sulphuret of iron as the best antidote in poisoning with this salt, but Orfila states that it only acts if taken immediately, and that if ten or fifteen minutes elapse before it is administered it is useless.

HYDRARGYRI BICYANIDUM, L. *Bicyanide of Mercury; Cyanuret of Mercury; Cyanide of Mercury.*

PREPARATION.—Percyanide of iron, ʒviij.; binoxide of mercury, ʒx.; distilled water, Oiv.; boil them together for half an hour and strain. Evaporate the liquor that crystals may be formed. Wash what remains frequently with boiling distilled water, and again evaporate the mixed liquors that crystals may be formed. Bicyanide of mercury may be otherwise prepared by adding as much binoxide of mercury as will accurately saturate it, to hydrocyanic acid distilled from ferrocyanide of potassium with diluted sulphuric acid.

PHYSICAL PROPERTIES.—This salt is met with crystallized in rectangular prisms; they are transparent or semi-opaque, colourless and inodorous, with a disagreeable metallic taste.

CHEMICAL PROPERTIES.—It is a cyanide of mercury, its composition being Hg Cy. It is anhydrous; is permanent in the air; and when exposed to heat is resolved into metallic mercury and cyanogen gas. It is soluble in 8 parts of water at 60°, and in much less boiling water, it is very sparingly soluble in alcohol.

THERAPEUTICAL EFFECTS.—This salt resembles in its effects corrosive sublimate, to which it is preferred by many as being more

soluble and not so easily decomposed. In this country, however, it is rarely used in medicine; and has been introduced into the London Pharmacopœia merely as being employed in the preparation of hydrocyanic acid.

DOSE AND MODE OF ADMINISTRATION.—Same as for corrosive sublimate.

INCOMPATIBLES.—Sulphuric and hydrochloric acids; sulphuretted hydrogen, and hydrosulphates.

HYDRARGYRI BINIODIDUM, L. E. HYDRARGYRI IODIDUM RUBRUM, D.—*Biniiodide of Mercury; Iodide of Mercury; Red Iodide of Mercury.*

PREPARATION.—*Dublin*.—"Take of corrosive sublimate, one ounce; iodide of potassium, ten drachms; distilled water, two pints, or as much as is sufficient. Dissolve the corrosive sublimate with the aid of heat in twenty-five ounces, and the iodide of potassium in five ounces of the water, and, when both solutions are cold, mix them. Decant the supernatant liquor when the precipitate has subsided, and having collected this latter upon a paper filter, wash it with the remainder of the water. Finally, dry the product at a temperature not exceeding 212° , and preserve it in a close bottle." *London*.—"Mercury, $\tilde{3}j$.; iodine, $\tilde{3}x$.; alcohol, a sufficiency; rub the mercury and the iodine together, adding the alcohol gradually until globules are no longer visible. Dry the powder with a gentle heat, and keep it in a well-stopped vessel." *Edinburgh*.—"Mercury, $\tilde{3}ij$.; iodine, $\tilde{3}iiss$.; concentrated solution of muriate of soda, cong. j .; triturate the iodine and mercury together, adding occasionally a little rectified spirit till a uniform red powder be obtained. Reduce the product to fine powder, and dissolve it in the solution of muriate of soda with the aid of brisk ebullition. Filter if necessary, through calico, keeping the funnel hot; wash and dry the crystals which form on cooling."

PHYSICAL PROPERTIES.—It is a brilliant red powder, which may be obtained in rhomboidal crystals by sublimation. It is inodorous, but has a strong metallic taste. Its specific gravity is 6.32.

CHEMICAL PROPERTIES.—It is composed of one equivalent of mercury, and 1 of iodine, Hg I. It is permanent in the air, heated moderately it becomes yellow, at a temperature of 400° it fuses, and at a higher temperature sublimes. Cooled rapidly it recovers its red colour, but when cooled slowly it remains yellow, in which state when rubbed, the red tint is immediately reproduced. It requires more than 6000 times its weight of water for solution; but is much more soluble in alcohol and acids, particularly with the aid of heat. It is soluble in a boiling solution of common salt, but a mere trace only is retained as it cools. It is also soluble in a solution of iodide of potassium.

Adulterations.—Owing to faulty preparation, iodide of mercury is apt to contain some of the sesqui- or sub-iodide; it may also contain sulphuret of mercury, derived from impurity in the metallic mercury employed. These as well as any fixed impurity are guarded against by the tests of the *Edinburgh Pharmacopœia*. "Entirely vaporizable; soluble entirely in 40 parts of a concentrated solution of muriate of soda at 212° , and again deposited in fine red crystals on cooling."

THERAPEUTICAL EFFECTS.—This is an exceedingly active preparation, producing violent inflammation when placed in contact with the skin. In its medicinal properties it appears to resemble much corrosive sublimate, and may be employed in the same cases. In doses of 1-12th of a grain given twice daily, and continued for some time, I have found it an excellent tonic in scrofulous habits. I have also used it very extensively in the treatment of organic diseases of the heart, more especially in those valvular affections which permit regurgitation, with very beneficial effects. As a topical remedy, in the form of ointment, it is applied with benefit to chronic glandular enlargements. Its use, however, requires much caution, especially when applied to raw surfaces.

DOSE AND MODE OF ADMINISTRATION.—Gr. 1-16th to gr. 1-8th made into pill with any of the tonic vegetable extracts.—*Unguentum Hydrargyri Iodidi rubri*, D.—*Biniiodidi*, L. ("Take of red iodide of mercury, one drachm; ointment of white wax, seven drachms. Incorporate the iodide of mercury and ointment by careful trituration in a mortar," D.—"Biniodide of mercury, ʒj.; white wax, ʒij.; lard, ʒvj.; add the salt to the wax and the lard melted together and mix," L.). Either of these ointments is much too strong for ordinary use, and should be further diluted with 3 or 4 times its weight of lard.

HYDRARGYRI CHLORIDUM, L. CALOMELAS, D. E. *Calomel* (described in the division *Cathartics*), is the most generally used, and one of the mildest preparations of mercury. It may be employed to produce the general effects of mercurials as before described; but it is almost exclusively administered in the treatment of inflammatory and febrile affections, in which it is usually given in combination with small doses of opium, to prevent it from acting on the bowels. As a *sedative* in dysentery and in epidemic cholera, its use has been before alluded to (see page 391); in these diseases, it is given in very large doses, (a scruple every hour or every second hour until two or three drachms are taken, or in single doses of ʒss. to ʒij.), with the very best effects. In the last epidemic of cholera, however, its administration in small doses frequently repeated, one to two grains every five or ten minutes, obtained many advocates. As an *alterative* it is very generally administered to children, who are not nearly so susceptible to the influence of calomel, or indeed of any other mercurial, as adults. To produce ptyalism, this is perhaps the most convenient of all the mercurial compounds, as salivation may be produced with it in a very short space of time, and with very little disturbance to the system generally. Its use as a cathartic has been before described (see page 89). Calomel is also added to other medicines to promote their peculiar effects; thus it is combined with digitalis or squill, to produce *diuresis*; and with Dover's powder or antimonials to increase their *diaphoretic* properties.

DOSE AND MODE OF ADMINISTRATION.—As an *antiphlogistic*, gr. iij. to gr. v. combined with one-fourth or one-half a grain of opium. As an *alterative*, gr. j. to gr. iij. twice a day. To produce *ptyalism*, gr. iij. to gr. v. are usually given night and morning; but by administering calomel in grain doses every hour, a sixth of a grain of opium being added to each dose should it affect the bowels, salivation may be produced in from 12 to 24 hours, provided proper preparatory treatment has been employed.—*Pilulæ Calomelanos compositæ*, (see page 157); Dose as an alterative, gr. v. to gr. x.—*Pilulæ Calomelanos et Opii*, E. (Calomel, 3 parts; opium, 1 part; conserve of red roses, a sufficiency; beat into a proper mass; to be divided into pills, each containing gr. iij. of calomel). Dose, one to two pills.—*Unguentum Calomelanos*, PEREIRA. (Calomel, 3j.; lard, 3j.). A useful application in some chronic cutaneous diseases.

HYDRARGYRUM IODIDUM VIRIDE, D. HYDRARGYRI IODIDUM, L. *Green Iodide of Mercury; Iodide of Mercury; Sub-iodide of Mercury.*

PREPARATION.—*Dublin.*—*London.*—"Mercury, 3j.; pure iodine, 3v.; rectified spirit (alcohol, L.), a sufficient quantity; rub the mercury and iodine together (in a porcelain mortar, D.), adding a few drops of the spirit until metallic globules are no longer visible (and the whole assumes a yellowish-green colour, D.). "Dry the residue at a temperature not exceeding 100°, in a dark room, and preserve it in a bottle impervious to light," D. "Dry the powder immediately with a gentle heat, without the access of light, and keep it in a well-stopped vessel," L.

PROPERTIES.—This is a dull greenish-yellow powder, insoluble in both water and alcohol; its composition is $Hg^2 I$. Exposed to light, or by the application of heat, it is readily resolved into metallic mercury and the red iodide. It is insoluble in solution of chloride of sodium. Its specific gravity is 7.75.

THERAPEUTICAL EFFECTS.—The green is a much milder preparation than the red iodide of mercury, but in other respects its properties are nearly similar. It is peculiarly adapted as an alterative for the diseases of infancy and childhood, more particularly for the chronic cutaneous affections to which children are so liable, and especially for those seated on the scalp.

DOSE AND MODE OF ADMINISTRATION.—Gr. j. to gr. iij. in pill; for children 1-6th of a grain to half a grain, combined with dried carbonate of soda and aromatic powder.—*Pilulæ Hydrargyri Iodidi*, L. (Iodide of mercury, 3j.; confection of dog-rose, 3iij.; ginger, powdered, 3j.; beat together till they are incorporated). Gr. v. contain gr. j. of the iodide; Dose, gr. v. to gr. xv.—*Unguentum Hydrargyri Iodidi*, L. (Iodide of mercury, 3j.; white wax, 3ij.; lard, 3vj.; add the iodide of mercury to the wax and lard melted together, and mix).

HYDRARGYRI NITRATIS UNGUENTUM, D. L. UNGUENTUM CITRINUM, D. E. *Ointment of the Nitrate of Mercury; Citrine ointment.*

PREPARATION.—*Dublin*.—"Take of pure mercury, one ounce; pure nitric acid, one fluid ounce; distilled water, half an ounce; prepared lard, four ounces; olive oil, eight fluid ounces. Mix the acid with the water, and dissolve the mercury in the mixture, with the aid of a gentle heat. Melt the lard with the oil, and, while the mixture is hot, add to it the solution of mercury, also hot; let the temperature of the mixture next be raised so as to cause effervescence, and then, withdrawing the heat, stir the mixture with a porcelain spoon, until it concretes on cooling". *London*.—"Mercury, ℥j.; nitric acid, f℥xj.; lard, ℥vj.; olive oil, f℥iv., first dissolve the mercury in the acid; then mix the solution, while hot, with the lard and oil melted together." *Edinburgh*.—"Nitric acid (Dens. 1380 to 1390), f℥ixss.; mercury, ℥iv.; axunge, ℥xv.; olive oil, f℥xxxviiiiss.; dissolve the mercury in the acid with the aid of a gentle heat. Melt the axunge in the oil with the aid of a moderate heat in a vessel capable of holding six times the quantity; and while the mixture is hot, add the solution of mercury also hot, and mix them thoroughly. If the mixture do not froth up, raise the heat a little till this take place. Keep the ointment in earthenware vessels, or in glass vessels secluded from the light."

PROPERTIES.—When recently prepared, this ointment is of a golden-yellow colour, and has an odour of nitrous acid. But it does not keep well, as no matter how carefully prepared, according to the directions of any of the British Pharmacopœias, after some time it acquires a grayish colour and becomes hard, when it is no longer fit for use. If an animal or fish oil, such as neat's-foot oil, trotter oil, or cod-liver oil, be substituted for the vegetable oil in the preparation of citrine ointment, the resulting ointment is of a dark brown, not golden, colour; but it keeps well, and is in my experience more efficacious as a remedial agent. An ointment so prepared is now generally kept in most of the shops in Dublin and dispensed under the name of brown citrine ointment (*Unguentum Citrinum fuscum*). Prepared with fresh butter it also keeps well, but its colour is very pale.

THERAPEUTICAL EFFECTS.—Citrine ointment is an excellent application in many forms of chronic ophthalmia, being especially useful when the eyelids are the seat of the disease; for this purpose it is generally diluted with an equal weight of lard. It is also an excellent application, when diluted with from four to six times its weight of white wax ointment, to herpetic eruptions, and to chronic eczema, impetigo, or herpes of the scalp, provided no inflammatory symptoms be present.

HYDRARGYRI OXYDUM, L. *Oxide of Mercury; Sub-oxide of Mercury; Black Oxide of Mercury.*

PREPARATION.—Chloride of mercury, ℥j.; lime water, cong. j.; mix, and frequently shake them. Set by, and when the oxide has subsided, pour off the liquor; lastly, wash it in distilled water until nothing alkaline can be perceived, and dry it in the air wrapped in bibulous paper.

PROPERTIES.—This is a black or grayish-black, heavy powder, tasteless and odourless. Its density is 10·69; its composition, Hg^2O . Exposed to heat it is resolved into metallic mercury and the oxide, and this change takes place slowly at ordinary temperatures, under the action of strong light; it then acquires a yellowish tinge. It is insoluble in water, and in the solutions of the alkalis, but it dissolves in nitric and acetic acids, combining with them to form salts.

Adulterations.—This preparation frequently contains the higher oxide, which may be detected by digesting for a short time with dilute hydrochloric acid, and straining; the acid dissolves out the higher oxide only, which is thrown down in the form of a yellow precipitate on the addition of solution of potash. If it contain any fixed impurity, it will not be entirely dissipated by heat. Metallic mercury may be detected by the black oxide not being completely soluble in acetic acid.

THERAPEUTICAL EFFECTS.—Black oxide of mercury produces the usual effects of the mercurial preparations, but owing to its varying composition, and the difficulty of preserving it unchanged, it is not employed internally. It is applied externally in the form of ointment (consisting of 1 part of oxide to 5 of lard), and it forms the active part of *black wash*, a most excellent application to chancres and other venereal sores, and one which is in very general use.—*Lotio nigra*, *Black wash*, (Calomel, 3j.; lime water, f3xij.; mix). This wash must be well shaken, so as to suspend the black oxide every time it is used. It is employed with benefit in most foul and indolent sores, although not of a venereal origin. Black oxide of mercury is also employed for mercurial fumigations, (see *Hydrargyr sulphuretum rubrum*).

HYDRARGYRI BINOXYDUM, L. *Red oxide of Mercury; Binoxide of Mercury; Oxide of Mercury.*

PREPARATION.—Bichloride of mercury, ʒiv.; solution of potash, f3xxviiij.; distilled water, Ovj.; dissolve the bichloride in the water; strain and add the solution of potash. The liquor being poured off, wash in distilled water the powder thrown down, until nothing alkaline can be perceived, and dry it with a gentle heat.

PHYSICAL PROPERTIES.—This oxide is met with in the form of an orange-red powder, odourless, with a disagreeable metallic taste. Specific gravity, 11·074.

CHEMICAL PROPERTIES.—Its composition is HgO , being a protoxide. At a heat below redness it is entirely resolved into metallic mercury and oxygen, and is therefore frequently employed in chemistry for procuring that gas. It is very slightly soluble in water, the solution acting feebly alkaline on vegetable colours.

Adulterations.—This preparation seldom contains any impurity. The best test of its freedom from adulteration is its complete solubility in hydrochloric acid.

THERAPEUTICAL EFFECTS.—Red oxide of mercury is not employed internally in medicine in the present day. It was formerly

used to produce salivation. The dose is from gr. $\frac{1}{4}$ th to gr. iss in pill. It may be used externally for the same purposes as the nitric oxide (see page 146), than which it is less caustic. It forms the active part of *yellow wash*, which is preferred by some to *black wash*, as an application to venereal sores.—*Lotio flava*, *Yellow wash*, (Corrosive sublimate, ʒj. ; lime water, fʒxij. ; mix).

HYDRARGYRI PRECIPITATUM ALBUM, E. HYDRARGYRI AMMONIO-CHLORIDUM, D. L. *White precipitate* ; *Ammonio-chloride of Mercury*. *White precipitate of Mercury*.

PREPARATION.—*Dublin*.—"Take of corrosive sublimate, one ounce ; solution of ammonia, nine fluid drachms ; distilled water, one pint. Dissolve the corrosive sublimate in the water, with the aid of a gentle heat, pour the ammonia into the solution, and, having stirred the mixture well, collect the precipitate on a filter, and wash it with warm distilled water, until the liquid which passes through ceases to give a precipitate when dropped into an acid solution of nitrate of silver. Lastly, dry the product at a temperature not exceeding 212° ." *London*.—*Edinburgh*.—"Bichloride of mercury (corrosive sublimate, E.), ʒvj. ; distilled water, ʒvj. ; solution of ammonia, fʒviij. ; dissolve the corrosive sublimate in the water with the aid of heat ; to this when cold, add the ammonia, stirring frequently ; collect the powder thrown down (on a calico filter, E.), and wash it thoroughly (with cold water, E.), (until it is free from taste, then dry it," L.).

PHYSICAL PROPERTIES.—This preparation is in the form of a bulky milk-white powder, odourless but having a styptic metallic taste.

CHEMICAL PROPERTIES.—It is a true chloro-amidide of mercury, its formula being $\text{Hg Cl} + \text{Hg Ad}$ (Kane). It is insoluble in cold water ; by boiling water it is decomposed into sal-ammoniac which is dissolved, and into a heavy yellow powder (*chloro-amidide and binoxide of mercury*, Kane,) which is insoluble in water. White precipitate may be distinguished from calomel by solution of ammonia, which does not alter the former, but blackens the latter. When heated suddenly, it is completely dissipated.

Adulterations.—I have never met with any impurity in this preparation. The London College has given the following tests for its purity, which have reference to its adulterations with starch, with white lead, with sulphate or carbonate of lime, or with black oxide of mercury :—"Totally evaporated by heat. When digested with acetic acid, iodide of potassium throws down nothing either yellow or blue. The powder rubbed with lime water does not become black. It is totally dissolved by hydrochloric acid without effervescence. When heated with solution of potash it becomes yellow, and emits ammonia."

THERAPEUTICAL EFFECTS.—White precipitate is not used as an internal remedy. Externally in the form of ointment, it is an excellent application in many forms of chronic cutaneous diseases, as in herpetic eruptions, sycosis mentis, impetigo, acne of the face, &c.—*Unguentum Hydrargyri ammonio-chloridi*, L.—*precipitati albi*, E. (White precipitate, ʒj. ; prepared lard, ʒiss. ; add the white precipi-

tate to the lard melted over a slow fire, and mix). This ointment has been omitted from the last edition of the Dublin Pharmacopœia.

HYDRARGYRI SULPHAS, D. *Sulphate of Mercury ; Persulphate of Mercury.*

PREPARATION.—Take of quicksilver of commerce, ten ounces ; oil of vitriol of commerce, six fluid ounces. Place the quicksilver and oil of vitriol in a porcelain capsule, and apply heat until effervescence ceases, and nothing remains but a white and dry crystalline salt.

This preparation, the composition of which is Hg O, SO^3 , has not been used in medicine. It is introduced into the pharmacopœia as being employed in the preparation of *calomel*, and of *corrosive sublimate*.

HYDRARGYRI SULPHURETUM CUM SULPHURE, L. *Black Sulphuret of Mercury ; Æthiops Mineral.*

PREPARATION.—Mercury ; and sulphur, of each, ℥ij. ; rub them together until globules are no longer visible.

PROPERTIES.—This is a heavy, black, insipid, and inodorous powder, the composition of which is not well known. It is insoluble in water. By heat it is fused, and completely dissipated.

Adulterations.—The complete dissipation by heat will show the absence of any fixed impurity, such as charcoal, or ivory black.

THERAPEUTICAL EFFECTS.—This preparation was at one time employed as an alterative in glandular and cutaneous diseases, but in the present day it is rarely used, and has consequently been omitted from the last edition of the Dublin Pharmacopœia. The dose of it is from gr. v. to ʒss.

HYDRARGYRI SULPHURETUM RUBRUM. HYDRARGYRI BISULPHURETUM, L. CINNABARIS, E. *Red Sulphuret of Mercury ; Cinnabar.* This compound of mercury has been omitted from the last edition of the Dublin Pharmacopœia.

PREPARATION.—*London.*—*Edinburgh.*—"Mercury, ℥ij. ; sulphur, ʒv. ; mix the mercury with the sulphur melted, and as soon as the mass swells up, remove the vessel from the fire ; and cover the vessel closely to prevent the mass from taking fire. Then reduce the material to powder (as soon as it is cold, E.), and sublime it."

PHYSICAL PROPERTIES.—This is the most common ore of mercury. When prepared for medical use, it occurs in the form of dark red crystalline masses, which when reduced to fine powder are

of a brilliant rich red colour, and then constitute the pigment *vermillion*. It is without odour or taste, and is insoluble in water, alcohol, or ether. Its specific gravity is 8.1.

CHEMICAL PROPERTIES.—Cinnabar is composed of one equivalent of mercury and one of sulphur, its formula being Hg, S. It is permanent in the air; by exposure to heat it is first blackened, and then totally dissipated. It is inflammable, burning with a blue flame, and a sulphurous-acid odour.

Adulterations.—Cinnabar is very liable to be adulterated with red lead, with realgar (*sulphuret of arsenicum*), with red oxide of iron, and with earthy impurities. When heat is applied, oxide of iron or any other earthy matter will be left; if the impurity be red-lead, metallic globules of lead will remain. Sulphuret of arsenicum may be detected by the usual tests for the preparations of that metal (see page 144).

THERAPEUTICAL EFFECTS.—Cinnabar is not used as an internal remedy. It is the preparation of the metal most generally employed for mercurial fumigations; for which purpose it is thrown on a plate of heated iron, and the fumes thus evolved, either inhaled to produce salivation, or directed on ulcerated parts. Mercurial fumigations, however, may be conducted in a much more easy manner, as proposed by the late Mr. Colles, “by directing the intended dose of cinnabar or grey oxide of mercury to be mixed with melted wax, and with a cotton wick be moulded into a small candle; this may be stuck on a common plate, and then burned under a curved glass funnel, which is to be raised about an inch from the plate.” Fumigations with the *mercurial candle* may be conveniently directed on any part of the body. They were highly recommended by Mr. Colles, for those obstinate ulcerations which occur about the roots of the nails.

INDIGO. *Indigo*. A peculiar colouring matter obtained from the leaves of several species of the genus *Indigofera*, especially *tinctoria*, *argentea*, *anil*, and *disperma*; which are natives of India, and belong to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Diadelphia Decandria*.

PREPARATION.—The plants are cut down just before the flowers appear, placed in large vats and covered with water; in which they are left for about 12 hours, until fermentation takes place, which process is sometimes promoted by using lime water. The liquor, which has acquired a yellow colour, is drawn off into another vat, beaten with rods, and constantly agitated until it becomes blue, and the indigo precipitates. It is then drained on calico, pressed and dried.

PHYSICAL PROPERTIES.—Indigo, as met with in commerce, is of a deep blue colour shaded with violet, smooth and hard; when rubbed it acquires a metallic appearance. It is inodorous, but has a somewhat metallic taste.

CHEMICAL PROPERTIES.—Indigo is a compound substance consisting of a *glutinous matter*, *indigo blue* (indigotin), *indigo brown*, and *indigo red*. The formula of indigo blue is $C^{16} H^5 N O^2$. It is insoluble in water, in cold alcohol and in ether; it is partially soluble in boiling alcohol.

THERAPEUTICAL EFFECTS.—Indigo has recently been employed on the continent in the treatment of nervous and spasmodic diseases, and it is said with great success. The diseases in which it has been found to be peculiarly beneficial are idiopathic epilepsy, chorea, hysteria, and convulsions.

DOSE AND MODE OF ADMINISTRATION.—It should be given in as large doses as the stomach will bear, but as it acts with much difference on different individuals, the dose should not at first exceed five grains three times a day, but it should be rapidly increased until ʒj. or even more is taken daily. It is best administered in the form of electuary, made with one part of indigo and two of syrup or honey; with which aromatics are in general combined.—*Compound Pills of Indigo*, (Indigo, gr. xv.; Opium, powdered, gr. ij.; extract of valerian; and extract of cinchona, of each, gr. xxij.; mix and divide into 24 pills). Dose, 4 daily. This combination has been highly praised by M. Michel, in idiopathic epilepsy; he directs for the patient at the same time a wine-glassful of infusion of arnica morning and evening.

IODINIUM, D. L. IODINEUM, E. *Iodine*.

PREPARATION.—Iodine is an article of the *Materia Medica* in the three British Pharmacopœias. It is procured by the manufacturers on the large scale from the ashes obtained by burning various species of sea-weed. These ashes, technically called *kelp*, are lixiviated with water, to which they yield about half their weight of salts. The mother liquor is poured off from these salts which are deposited by evaporation and crystallization; it is then treated with sulphuric acid, and as soon as all effervescence has ceased, in about a day or two, it is put into leaden retorts with black oxide of manganese, and heated to 140° F., when the iodine passes over in the state of vapour and is condensed in proper receivers. Iodine as it occurs in commerce being seldom sufficiently pure for medical purposes, it is ordered by the Dublin and Edinburgh Colleges to be purified as follows, when it constitutes *Iodinium purum*, D. E. *Dublin*.—"Take of iodine of commerce, any convenient quantity. Introduce it into a deep porcelain capsule of a circular shape, and, having covered this as accurately as possible with a glass matrass filled with cold water, apply to the capsule a water heat for the space of twenty minutes, and then, withdrawing the heat, permit the capsule to cool. Should the sublimate attached to the bottom of the matrass include acicular prisms of a white colour and pungent odour, let it be scraped off with a glass rod, and rejected. The matrass being now returned to its previous position, a gentle and steady heat (that of a gas-lamp answers well) is to be applied, so as to sublime the entire of the iodine. Upon now lifting off the matrass, the purified product will be found attached to its bottom. When separated, it should be immediately enclosed in a bottle furnished with an accurately ground stopper. *Edinburgh*.—"As met with in commerce, iodine is generally adulterated with variable proportions of water, and being consequently unfit for making pharmaceutic preparations of fixed and uniform strength, it must be dried by being placed in a shallow basin of earthenware in a small confined space of air with ten or twelve times its weight of fresh burnt lime, till it scarcely adheres to the inside of a dry bottle."

PHYSICAL PROPERTIES.—Iodine is generally met with in the form of small crystalline scales often accreted into masses, of a bluish-black colour with a metallic lustre. It has a strong disagreeable odour resembling that of chlorine, and a very acrid taste. From a solution in liquid hydriodic acid, it may be obtained in tolerably large crystals, which are oblique octohedrons with a rhombic base. Its density is 4.948.

CHEMICAL PROPERTIES.—Iodine is an elementary body existing in combination in both kingdoms of nature. It evaporates slowly at the usual temperature if exposed to the air, and more rapidly if moistened. It fuses at 225° , and boils at 347° . Exposed to an increased temperature it is volatilized in the form of a beautiful violet-coloured vapour from whence it has derived its name, (*ἰώδης*, violet). It requires 7000 parts of pure water for its solution, to which it imparts a brownish colour; it is much more soluble in alcohol, and very soluble in ether. Solutions of the iodides in water dissolve much iodine; the best characteristic of iodine is its action on starch, (see page 203).

Adulterations.—Iodine is frequently adulterated with fixed substances, such as charcoal, plumbago, black oxide of manganese, &c., all of which may readily be detected by their not being sublimed on the application of heat, or by their being left as an insoluble residue when iodine is treated with alcohol. Attention has been also directed by Professor Christison to an adulteration of much consequence, that with water, of which it frequently contains from 15 to 20 per cent: that is to say, $\bar{3}j$. of iodine may contain $\bar{3}iss$. or even more of water. It may readily be detected by pressing a specimen between folds of filtering paper, or by shaking it in a very dry bottle. If greater accuracy be required, the test of the *Edinburgh Pharmacopœia* may be applied—"Gr. xxxix. with gr. ix. of quick lime, and $\bar{f}3ijj$. of water when heated short of ebullition, slowly form a perfect solution, which is yellowish or brownish if the iodine be pure, but colourless if there be above two per cent. of water or other impurity."

THERAPEUTICAL EFFECTS.—Introduced into the stomach, iodine exerts a local irritant action on that viscus, causing nausea and vomiting; in large doses, it produces the effects of an irritant poison; but in many instances, even when taken in enormous quantities, it has produced scarcely any effect. In slight or medicinal doses, iodine acts as a special stimulant to the glandular system, generally at the same time affecting the organs of secretion, increasing the quantity of fluid secreted. Under the continued use of small doses of this substance, the removal or palliation of disease will sometimes take place without any perceptible action on the system generally; in other instances, much emaciation and derangement of the digestive functions will be produced; while the very reverse effect, namely, deposition of fat and increased appetite, has been noticed by many as the consequence of a lengthened administration of iodine. A curious fact, but which has rarely if at all been wit-

nessed in this country, is, that absorption of the mammæ in females, and wasting of the testicles in males have been produced by the continued administration of iodine.

A remarkable train of symptoms, characterising a peculiar disordered state of the system which has been named *iodism*, occasionally arises when the use of this substance in frequent small doses has been persisted in for a long time. These symptoms are nausea, head-ache, general langour and loss of appetite, followed by vomiting and purging, extreme depression, frequent small pulse, great weakness, fainting, and dry cough occasionally attended with inflammation of the mucous membrane lining the air passages, and terminating in death, if the use of the iodine be not abandoned in time. Iodism is, however, in the present day, rarely witnessed, and when it does occur, it is easily checked by suspending the use of the medicine.

Iodine is a most valuable remedial agent in the treatment of glandular enlargements, and in scrofulous affections; but its employment is contra-indicated when acute inflammation is present. In *bronchocele*, it has proved more successful than any other remedy which has ever been used; indeed there are few cases, unless where the thyroid gland has become completely indurated, which will withstand the use of iodine when continued steadily for six weeks or two months; and even cases where the gland is much indurated are often remarkably relieved. In the innumerable varieties of scrofulous affections, this remedy is most extensively employed and with decided advantage. It is found particularly beneficial in glandular swellings, tumours, abscesses, ulcers, ophthalmia, and diseases of the bones occurring in scrofulous constitutions. Iodine has also proved eminently successful in chronic enlargements of the abdominal viscera, particularly of the liver, spleen, and ovaries. There are no remedies which in my experience prove so successful in the treatment of cutaneous diseases, especially those of a chronic character, as iodine and its preparations; but to prove beneficial, their administration must be persisted in for some time, until in fact the system is manifestly brought under their influence. In fine, iodine has been proposed as a remedy in phthisis, in amenorrhœa, in leucorrhœa, in gout, in palsy, in chorea, in ascites, &c.; but in all these cases its success is very equivocal. The inhalation of the vapour of iodine was at one time very much used in the treatment of phthisis and of chronic bronchitis, but general experience has proved its inutility. An injection composed of one part of tincture of iodine and three parts of water, is used after tapping, for the radical cure of hydrocele. Topically, iodine is employed in the form of tincture or of ointment as a local stimulant in many forms of chronic cutaneous diseases, to enlarged glands, in chronic swellings of the joints, to inflamed bursæ, to buboes, over large chronic abscesses, in erysipelas, &c.; but its external employment requires caution, as if applied in too concentrated a form, it is apt to excite severe local inflammation.

DOSE AND MODE OF ADMINISTRATION.—Iodine is not administered in substance; and as it is usually given in combination with iodide of potassium, (see page 419), there are no simple preparations of it contained in the Dublin or London Pharmacopœias; a tincture is officinal in that of Edinburgh.—*Tinctura Iodini*, E. (Iodine, ʒiiss.; rectified spirit, Oij.; dissolve the iodine in the spirit with the aid of a gentle heat and agitation; keep the tincture in well-closed bottles). One fluid-drachm contains gr. iij. $\frac{3}{4}$ of iodine; Dose, min. v. to min. xx. two or three times a-day; it may be given in fʒss. of water and sweetened with simple syrup.

INCOMPATIBLES.—Ammonia, sulphur, phosphorus, metals and their salts, hydrosulphates, sulphuric, nitric, and hydrocyanic acids, arsenic, and the vegetable alkaloids.

In poisoning with iodine, emetics should be administered and their operation aided by the use of demulcent and amylaceous drinks, as starch, flour, &c., diffused through tepid water or milk.

MORRHUÆ OLEUM, D. *The oil obtained from the liver of Morrhua vulgaris, the common Cod.*

PREPARATION.—Although this oil is directed by the Dublin College to be obtained from the liver of the Common Cod, *Morrhua vulgaris*, it is also procured from other allied species, such as the Ling—*Gadus lota*, the Dorse—*Gadus callarias*, the Torsk—*Gadus brosmia*, &c. Much of what is met with is imported from Newfoundland, and from the north of Europe, where it is prepared by exposing the livers to the sun to putrefy, when the oil runs from them, and is received in vessels placed underneath: thus prepared, according to M. de Jongh, it constitutes the *pale* oil of commerce; by boiling the residuum the *brown* oil is procured; and the *light brown* oil is the *impaired pale* oil, either from the livers having lain too long, or in consequence of the pale oil having been kept too long in warehouses or exposed to damp. What is drawn in this country is procured by simply boiling the fresh livers (exposing them to a temperature not higher than 192° F., DONOVAN) expressing and filtering.

PHYSICAL PROPERTIES.—As generally met with, cod-liver oil is transparent, varying in colour from pale straw yellow to rich golden brown, with the odour of fresh boiled cod, and a greasy, bland taste, leaving a disagreeable impression on the palate. Some specimens have a very rancid odour, and an exceedingly nauseous taste. Three varieties of different colours, as above described, are met with in the shops.

CHEMICAL PROPERTIES.—According to the analysis of M. de Jongh, it contains three peculiar principles, one of which has been named *gaduine*, oleic and margaric acids, glycerine, traces of butyric, acetic, fellic and choleic acids, salts of soda, lime, and magnesia, some other unimportant substances, phosphorus, phosphoric acid, iodine, and chlorine, with a trace of bromine. The *pale* oil contains the greatest quantity of iodine, chlorine, bromine, phosphorus, and salts; while the *brown* oil is richest in the component parts of the bile, butyric and acetic acids. It appears then from this analysis, that

the medicinal properties of the oil are due to the presence of the powerful elements, iodine, chlorine, phosphorus, and bromine, naturally combined with other constituents, probably of less importance, in an *organic oil*.

THERAPEUTICAL EFFECTS.—Professor Bennett of Edinburgh was unquestionably the first British physician of modern times to direct the especial notice of the profession to this most valuable therapeutic agent, for until the publication of his book in 1841, cod-liver oil, although at one time much employed in England, had fallen completely into disuse. It is as a remedy for phthisis that this oil has proved so important an addition to the *Materia Medica*, and from the vast experience of its efficacy which has been accumulated within the last few years, I do not think that I am asserting too much for it when I state that its use has removed tubercular consumption from the list of incurable diseases. It is employed with benefit in all stages of the disease, nor do any local symptoms contraindicate its use; should any of these, such as inter-current pneumonia or pleuritis, diarrhoea, sweating, vomiting, &c., be present, they should be treated by the remedies applicable to each, but in the mean time the administration of the oil should not be suspended. It must therefore be remembered that it is as an adjunct to other treatment that cod-liver oil proves so valuable a remedy in phthisis; and in the hands of those who look upon it as a *sole* remedy in this disease, it can only be productive of disappointment. As the remediate efficacy of cod-liver oil in consumption depends probably to a great extent on the readiness with which an animal oil is assimilated in the human economy, it is especially requisite in order to obtain the full benefit derivable from its use, that the patient should breathe a healthy atmosphere, and as far as practicable take exercise in the open air. I am far, however, from believing that the remedial powers of this medicine are solely due to the property here referred to, nor do I think that, as some physicians have suggested, similar effects are produced by other fatty matters, whether alone or combined artificially with iodine, bromine, &c. Besides phthisis, cod-liver oil has been employed in a great number of diseases, but it appears to be particularly useful in chronic rheumatism, in scrofulous abscesses and caries of the bones, in arthritis, in rickets, in strumous ophthalmia, and in obstinate cutaneous affections. It is productive of very great benefit in the treatment of many forms of neuralgia; and I have employed it in some cases of diabetes with much benefit. In most of these diseases, its external application is beneficially combined with its internal use; and to prove successful, its administration must be persevered in for a very long period, in some instances even for years.

DOSE AND MODE OF ADMINISTRATION.—Cod liver oil should in all cases be given at first in small doses: for adults a dessert spoonful, and for young persons a tea spoonful three times a day; and this quantity should be gradually increased until a table spoonful is taken three times daily. I have not seen much advantage in giving

a larger quantity than this, but some physicians prescribe so much as a pint of the oil in the 24 hours. It is most readily taken floating on a glass of water or boiled milk; to the former some aromatic tincture, as of orange or lemon-peel, may be added, or it may be given made into an emulsion with a solution of potash and some aromatic water. But no matter how it is attempted to be disguised, it creates in some persons an intolerable disgust, leaving a most disagreeable and permanent impression on the mouth and fauces, which, together with the length of time its administration must be persisted in, prevented it for a long period from coming into general use. Dr. Urc has suggested the adoption of cod livers as a diet for patients who are recommended to take the oil; and in order to prevent the dissipation of the oil during the cooking, the livers should be suddenly immersed in boiling water, to which sufficient salt has been added to raise the boiling point to 220° F. He states that he has used this diet himself without inconvenience, employing mashed potato as a vehicle for the oil which exudes on cutting the liver. Dr. Copeland recommends the liver to be used as an article of diet, prepared in the following way:—The stomach of the fish is well washed, two parts filled with the fresh liver, and firmly tied at each end so as not to allow any of the oil to escape whilst being boiled. This is eaten *quite warm*, with a little salt and spice, in which state he says that it is very palatable. In all cases the oil sits most easily on the stomach when it is taken during or immediately after meals, being thus digested with the food.

The oil obtained from the liver of the Skate, *Raia Clavata*, has been proposed as a substitute for cod-liver oil; it is stated to be less disagreeable to the taste, and also more efficacious in its therapeutical effects.

NUX-VOMICA, D. L. E. *Seeds of Strychnos nux-vomica.* A native of the Indian Continent, of the Coasts of Coromandel, and of the Island of Ceylon; belonging to the Natural family *Apocynaceæ* (*Loganiaceæ*, Lindley), and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—A moderate sized tree; Trunk thick, with a greyish mottled bark covered in parts with a reddish-brown efflorescence; Branches, opposite, long; Leaves, oval, shining, leathery, 5-nerved; Flowers in small terminal corymbs, greenish-white; Fruit, ovoid, orange-coloured, one-celled, pulpy, about the size of a small apple, containing many seeds.

PHYSICAL PROPERTIES.—*Strychnos* seeds, *nux-vomica*, are about an inch in diameter and two lines thick, round, nearly flat, umbilicated and slightly convex on one side, concave on the other. Externally they are of an ash-grey colour, satiny, covered with short yellowish hairs; internally they consist of a horny, whitish or yellowish *albumen*, which separates into two parts, and contains, in a small cavity in the circumference, the *embryo* with its two

acuminate cotyledons. *Nux-vomica* seeds are with difficulty reduced to powder; they are inodorous, but have an acrid, intensely bitter taste. The bark has been occasionally met with in British commerce under the name of *False-angustura bark* (see *Cusparia*).

CHEMICAL PROPERTIES.—*Nux vomica* consists of two peculiar alkaloids, *strychnia* and *brucia*, in combination with a peculiar acid, *igasuric* or *strychnic acid*, with other unimportant matters. Its medicinal properties depend on the alkaloids, the former of which is the more active, and is officinal in the three British Pharmacopœias. It is prepared as follows:—

Dublin.—"Take of *nux-vomica*, in powder, one pound; water, one gallon and a half; oil of vitriol of commerce, half a fluid ounce; slaked lime, one ounce; rectified spirit, one quart; dilute sulphuric acid; solution of ammonia, of each, a sufficient quantity; prepared animal charcoal, half an ounce. Macerate the *nux-vomica* for twenty-four hours with half a gallon of the water, acidulated with two drachms of the acid, and, having boiled for half an hour, decant. Boil the residuum with a second half-gallon of the water, acidulated with one drachm of the acid; decant, and repeat this process with the remaining water and acid, the undissolved matter being finally submitted to strong expression. The decanted and expressed liquors having been passed through a filter, and then evaporated to the consistence of a syrup, let this be boiled with the rectified spirit for twenty minutes, the lime being added in successive portions during the ebullition, until the solution becomes decidedly alkaline. Filter through paper, and having drawn off by distillation the whole of the spirit, let the residuum be dissolved in the dilute sulphuric acid, and to the resulting liquid, after having been cleared by filtration, add the solution of ammonia in slight excess, and let the precipitate which forms be collected upon a paper filter, dried, and then dissolved in a minimum of boiling rectified spirit. Into this solution introduce the animal charcoal, digest for twenty minutes, then filter, and allow the residual liquor to cool, when the *strychnia* will separate in crystals." *London.*—"Nux-vomica, bruised, lbj.; rectified spirit, cong. iij.; diluted sulphuric acid; magnesia; and solution of ammonia, of each, q. s.; boil the bruised *nux-vomica* with a gallon of the spirit for an hour in a retort, to which a receiver is fitted, pour off the liquor, and again, and a third time boil what remains with another gallon of spirit, and the spirit recently distilled, and pour off the liquor. Press the *nux-vomica*, and let the spirit distil from the mixed and strained liquors. Evaporate what remains to the proper consistence of an extract. Dissolve this in cold water and strain. Evaporate the liquor with a gentle heat until it has the consistence of a syrup. To this, while yet warm, gradually add the magnesia to saturation, shaking them together. Set it aside for two days, then pour off the supernatant liquor. Press what remains wrapped in a cloth. Boil it in the spirit, then strain, and let the spirit distil. Add to the residue a very little diluted sulphuric acid mixed with water, and macerate with a gentle heat. Set it aside for 24 hours that crystals may form. Press and dissolve them. Afterwards to these dissolved in water add ammonia, frequently shaking, that the *strychnia* may be thrown down. Lastly, dissolve this in boiling spirit, and set it aside that crystals may be produced." *Edinburgh.*—"Nux-vomica, lbj.; quicklime, ℥iss.; rectified spirit, q. s.; subject the *nux vomica* for two hours to the vapour of steam, chop or slice it, dry it thoroughly in the vapour-bath or hot-air press, and immediately grind it in a coffee-mill. Macerate it for 12 hours in Oij. of water and boil it; strain through linen or calico, and squeeze the residuum; repeat the maceration and decoction twice with Oiss. of water. Concentrate the decoctions to the consistence of thin syrup; add the lime in the form of milk of lime; dry the precipitate in the vapour bath, pulverize it, and boil it with successive portions of rectified spirit, till the spirit ceases to acquire a bitter taste. Distil off the spirit till the residuum be sufficiently concentrated to crystallize on cooling. Purify the crystals by repeated crystallizations."

Strychnia crystallizes in colourless minute octohedrons, but as met with in commerce it is usually in the form of a greyish white

granular powder; it is odourless, but has an intensely bitter taste. It is soluble in 2500 parts of boiling, and in 6667 parts of cold water; but this last solution, if still further diluted with 100 times its weight of water, tastes strongly bitter. It dissolves in diluted alcohol, but is insoluble in absolute alcohol and in ether. It is permanent in the air, acts as an alkali on vegetable colours, and combines with acids to form salts. The composition of strychnia is $C^{44} H^{23} N^2 O^4$, (Regnault.)

Brucia is not employed in medicine, and therefore need not be particularly described here. In most of its properties it resembles strychnia, but it is more soluble in water, and produces a rich red color with nitric acid, which change does not occur with perfectly pure strychnia. Powdered nux-vomica is of a grayish-yellow colour; it yields its active principles to water and diluted alcohol, but not to ether.

Adulterations.—According to Christison, powdered nux-vomica is frequently adulterated with common salt, but I have never met with this impurity; it may readily be discovered, by treating the powder with cold water, filtering, evaporating and crystallizing. Strychnia is very liable to adulteration, and as met with in commerce is never free from brucia and colouring matter, and consequently among the characteristics of the alkaloid, the Edinburgh College has stated, that it is strongly reddened by nitric acid, which, as above remarked, does not occur unless brucia be present: that it is sufficiently pure for medical purposes, may be known by the following test:—"A solution of gr. x. in f3iv. of water by means of f3j. of pyroligneous acid, when decomposed by f3j. of concentrated solution of carbonate of soda, yields on brisk agitation an adhesive mass, weighing when dry gr. x. and entirely soluble in solution of oxalic acid," *Edinburgh Pharmacopœia*.

THERAPEUTICAL EFFECTS.—In very small doses, nux vomica appears to act as a tonic; but in somewhat larger doses it operates as a special stimulant to the medulla oblongata and spinal marrow, without affecting the sensorium. Its effects are principally exerted on the nerves of motion, as indicated by the spasmodic twitchings of the voluntary muscles, which, when the dose is large or the use of small doses has been continued for some time, amount to violent tetanic spasms. It is a very active poison, so small a dose as 3ss. of the powder, or gr. j. of pure strychnia having proved fatal; the symptoms which precede death are simply those of tetanus and asphyxia. As a medicinal agent, the principal use of nux-vomica has been in the treatment of chronic paralytic affections; but as it does not prove equally serviceable in all forms of paralysis, and in some proves absolutely injurious, it will be necessary to state the circumstances which demand or contra-indicate its use.

When paralysis is the consequence of inflammatory action in the brain or spinal marrow, or is produced by what is indeed the most common cause, the pressure of effused blood on the nervous centres, nux-vomica always proves injurious, unless the inflammatory action

has been previously subdued, or a length of time has elapsed since the effusion had taken place. It proves beneficial more frequently in general than in partial paralysis, and in paraplegia than in hemiplegia. It is, however, often of service in palsy of certain organs, as in incontinence of urine depending on paralysis of the muscles of the bladder, and, when applied by the endermic method, in some forms of amaurosis. *Nux vomica* and its alkaloid have also been employed in the treatment of other affections of the nervous system, as in chorea, epilepsy, and nervous tremors; in the latter of which it appears to have proved of most service. I have used extract of *nux-vomica* with much advantage as an addition to purgatives in constipation depending on want of tone in the muscular coat of the large intestines, one of the most frequent causes of this state in females, and one which is distinctly characterized by the great secretion of flatus, and colicky pains which accompany it; for a nearly similar reason it is a most useful remedy in the constipation of painter's colic. In epidemic dysentery, its beneficial effects have been highly spoken of in Germany and in Sweden; and I have derived much benefit from the administration of the extract in chronic diarrhœa; especially that form of the disease which may be termed *nervous* diarrhœa. It has also been found successful occasionally, in the treatment of amenorrhœa, of hypochondriasis, of dyspepsia, of gastrodynia, of prolapsus ani, of impotence, &c. It is remarkable that when administered in paralysis, the effects of *nux vomica* on the muscular system are principally, though not, as was at one time imagined, entirely, confined to the paralysed parts.

DOSE AND MODE OF ADMINISTRATION.—*Nux-vomica* may be administered in powder in doses of gr. v. gradually increased to gr. xx.—*Extractum Nucis Vomicae*, E. (Take of *nux-vomica*, any convenient quantity; expose it in a proper vessel to steam until it is completely softened; slice it, dry it thoroughly, and grind it in a coffee-mill; exhaust the powder either by percolating it with rectified spirit, or by boiling it with repeated portions of rectified spirit, till the spirit comes off free from bitterness. Distil off the greater part of the spirit; and evaporate what remains to a proper consistence in the vapour-bath, E.). Dose, gr. ss. gradually increased to gr. iij. in the form of pill. When carefully prepared, this extract is an excellent preparation, and might be used instead of strychnia, which is very difficult to prepare, and in general is so much adulterated. It has been omitted from the last edition of the Dublin pharmacopœia. — *Tinctura Nucis Vomicae*, (*Nux-vomica*, rasped, ʒij.; rectified spirit, fʒviiij.; macerate for 7 days and filter). This tincture might be readily prepared by percolation; but the above is the formula of the Dublin Pharmacopœia of 1826; it has been omitted in the last edition. In consequence of its intense bitterness, it was not much used internally; it is, however, a most excellent remedy in the treatment of nervous tremors and of other nervous symptoms which are so often dependant on dyspepsia and hypochondriasis. Externally it may be employed in the form of embro-

cation to paralysed parts. Dose, min x. to min. xxx.—*Strychnia*, D. L. E. Dose, 1-12th of a grain gradually and slowly increased until its effects are produced; always diminishing the dose at first, when a different sample of the drug is employed. It is usually given made into pill with crumb of bread, or with conserve of roses: but as it is difficult to divide it with sufficient accuracy into pills, a preferable method is to dissolve a grain in f3ij. of rectified spirit, with the aid of min. ij. of sulphuric, hydrochloric, or acetic acid; so that every min. x. of this solution will contain 1-12th of a grain of the salt of strychnia. The following formula for preparing the hydro-chlorate is given in the last Dublin Pharmacopœia.—*Murias Strychnia*, D. ("Take of strychnia, one ounce; dilute muriatic acid, one fluid ounce, or a sufficient quantity; distilled water, two ounces and a-half. Pour the acid upon the strychnia, and, adding the water, apply heat until a perfect solution is obtained. Let this cool, and let the crystals which form be dried upon bibulous paper. By evaporating the residual liquid to one-third of its bulk, and then allowing it to cool, an additional quantity of the salt will be obtained.") The dose is the same as of the pure alkaloid. I prefer much the sulphate to this salt. When applied by the *endermic* method, gr. ss. of the alkaloid, or of any of its salts, may be sprinkled over the surface previously denuded of its cuticle, or the solution described above may be used. No matter how administered, great attention is requisite during the use of nux-vomica or its alkaloid, in consequence of their great activity as poisons, our ignorance of any chemical antidote, and from the fact of some individuals being much more susceptible of their effects than others.

PLUMBI IODIDUM, D. L. E. *Iodide of Lead.*

PREPARATION.—*Dublin*.—"Take of nitrate of lead; iodide of potassium, of each, one ounce; distilled water, two pints. Dissolve, with the aid of heat, the nitrate of lead in a pint, and the iodide of potassium in half a pint of the water, and mix the two solutions when cold. Decant the clear solution when the precipitate has subsided, and having transferred the latter to a filter, wash it with the remainder of the water. Finally, dry the product at a temperature not exceeding 212°, and preserve it in a close bottle." *London*.—"Acetate of lead, ʒix.; iodide of potassium, ʒvij.; distilled water, cong. j.; dissolve the acetate of lead in Ovj. of the water, and strain; add to this the iodide of potassium first dissolved in Oij. of the water, wash what is precipitated and dry it." *Edinburgh*.—"Iodide of potassium, and nitrate of lead, of each, ʒss.; water, Oiss.; dissolve the salts separately, each in one-half of the water; add the solutions, collect the precipitate on a filter of linen or calico, and wash it with water; boil the powder in cong. iij. of water acidulated with f3ij. of pyroligneous acid. Let any undissolved matter subside, maintaining the temperature near the boiling point, and pour off the clear liquor, from which the iodide of lead will crystallize on cooling."

PROPERTIES.—Iodide of lead occurs in the form of a fine golden-yellow powder, or in brilliant crystalline scales of the same colour; odourless and tasteless. It is permanent in the air, but by exposure to light, loses its brilliancy; by heat it is fused. It is soluble in

579 parts of cold, and 254 parts of boiling water; it is also soluble in solution of potash. The composition of iodide of lead is Pb. I.

Adulterations.—I have not met with any adulterations in iodide of lead. The following tests for its purity are given in the Edinburgh Pharmacopœia.—“Bright yellow; gr. v. are entirely soluble with the aid of ebullition in fʒj. of pyroligneous acid diluted with fʒiss. of water; and golden crystals are abundantly deposited on cooling.”

THERAPEUTICAL EFFECTS.—The effects of this preparation are not well understood; according to some, its internal use produces the constitutional action of lead; according to others, that of iodine. In this country it is rarely given internally. Externally it is applied in the form of ointment to chronic glandular enlargements, indolent ulcers, and obstinate cutaneous affections occurring in strumous habits. In porrigo capitis I have used it with excellent results, and increased experience confirms the opinions I have published on its efficacy in this disease, for which I was the first to propose its employment.* It is also used with very great benefit as an application to cancerous tumours, for which purpose it is particularly adapted from its not producing any cutaneous irritation, and from its being more actively promotive of absorption than the other preparations of iodine.

DOSE AND MODE OF ADMINISTRATION.—Gr. iij. to gr. v. made into pill with conserve of roses or extract of liquorice.—*Unguentum Plumbi Iodidi*, D. L. (“Take of iodide of lead, in fine powder, one drachm; ointment of white wax, seven drachms. Mix the iodide of lead intimately with the ointment by trituration,” D.—“Iodide of lead, ʒj.; lard, ʒviij.; rub together and mix,” L.). Half a drachm of this ointment may be rubbed in very gently twice a day over cancerous or other tumours. I usually employ it at first of half this strength.

INCOMPATIBLES.—Sulphuric and carbonic acids; and their salts.

POTASSII BROMIDUM, L. *Bromide of Potassium.*

PREPARATION.—*London.*—“Bromine, ʒij.; carbonate of potash, ʒij. ʒj.; iron filings, ʒj.; distilled water, Oijj.; first add the iron, and then the bromine to Oiss. of the distilled water; set them by for half an hour, frequently stirring them with a spatula. Apply a gentle heat, and when a greenish colour occurs, pour in the carbonate of potash dissolved in the remainder of the water; strain, and wash what remains in Oij. of boiling distilled water, and again strain. Let the mixed liquors be evaporated so that crystals may be formed.

PROPERTIES.—This salt crystallizes in colourless, transparent, rectangular prisms or cubes. It is inodorous, but has an acrid saline taste; is very soluble in water, and but slightly soluble in alcohol. The crystals are unalterable in the air, exposed to heat, they decre-

* Treatise on Diseases of the Scalp, 1848, p. 43; and Dublin Quarterly Journal of Medical Science, new series, vol. viii. p. 164.

pitae, and fuse at a red heat without undergoing any change. The composition of bromide of potassium is K Br.

Adulterations.—If this salt contain any sulphate, it will give a white precipitate with solution of chloride of barium. It is often adulterated with chloride of potassium or chloride of sodium; the following is the test given by the London College for the detection of either impurity:—"Gr. x. decompose 14·28 grains of nitrate of silver, precipitating a yellow bromide of silver which is little affected by nitric acid, but is re-dissolved by ammonia." If it decompose more nitrate of silver than the quantity above stated, it is owing to the presence of a chloride.

THERAPEUTICAL EFFECTS.—The effects of bromide of potassium are generally stated to be analogous to those of iodide of potassium, which will be presently stated; with this opinion, my own experience of its action leads me completely to coincide. Dr. Williams of London employed it internally in enlargements of the spleen, in which he states that it possesses unusual, if not specific powers. But it has not proved equally successful in the hands of other practitioners. Externally it has been employed in the form of ointment to scrofulous and indolent swellings.

DOSE AND MODE OF ADMINISTRATION.—Gr. iij. to gr. xij. three times a day, dissolved in water and sweetened with syrup. For an ointment, ʒj. to ʒij. of the salt, may be combined with ʒj. of lard; if a stronger ointment, or one resembling the compound iodine ointment, be wished for, min. vj. of bromine are to be added to this.

INCOMPATIBLES.—Acids; acidulous and metallic salts.

POTASSII IODIDUM, L. E. *Iodide of Potassium; Hydriodate of Potash.* (Syn. *Potassæ Hydriodas*, D.)

PREPARATION.—*Dublin.*—"Take of pure iodine, reduced to powder, four ounces and a half; filings, or thin turnings of wrought iron, separated from impurities by a magnet, two ounces; pure carbonate of potash, two ounces and a half, or a sufficient quantity; distilled water, three pints and a half: heat gently five ounces of the water with the iron and three ounces of the iodine, for twenty minutes, and then boil until the solution loses its red colour. Filter this through paper, washing the filter with five ounces of water at a boiling temperature, and, in the solution thus obtained, dissolve, by digestion and shaking, the remainder of the iodine. To the carbonate of potash, dissolved in a quart of the water, and heated to 212° in a large porcelain capsule, add the solution of iron and iodine, and boil until effervescence ceases, adding, if necessary, a little more carbonate of potash, so that the liquor may be very slightly alkaline. Filter now, washing the precipitate with the remaining pint of water boiling hot, and, having evaporated the liquid till a pellicle begins to appear on its surface, let it be set by, that crystals may form. These, when dried on blotting paper, should be preserved in a bottle furnished with a perfectly tight stopper. The liquor from which the crystals have separated will, by further evaporation and cooling, afford an additional quantity of the salt." *London.*—"Iodine, ʒvj.; carbonate of potash, ʒiv.; iron filings, ʒij.; distilled water, Ovj.; mix the iodine with Oiv. of the water, and add the iron, stirring them frequently with a spatula for half an hour. Apply a gentle heat, and when a greenish colour occurs, add the carbonate of potash, first dissolved in the Oij. of water, and strain. Wash what remains with Oij. of boiling distilled water, and again strain.

Let the mixed liquors be evaporated, so that crystals may be formed." *Edinburgh*.—"Iodine, (dry), ℥v. ; fine iron wire, ℥ij. ; water Oiv.; carbonate of potash (dry), ℥ij. ℥xj. ; with the water, iodine, and iron-wire, prepare solution of iodide of iron as directed for *Ferri Iodidum*. Add immediately, while it is hot, the carbonate of potash previously dissolved in a few ounces of water, and stir carefully, filter the product, and wash the powder on the filter with a little water. Concentrate the liquor at a temperature short of ebullition, till a dry salt be obtained; which is to be purified from a little red oxide of iron and other impurities, by dissolving it in less than its own weight of boiling water, or still better, by boiling it in twice its weight of rectified spirit, filtering the solution, and setting it aside to crystallize. More crystals may be obtained by concentrating and cooling the residual liquor."

PHYSICAL PROPERTIES.—This salt crystallizes in white, opaque cubes or quadrangular prisms; at present generally met with in fragments of well defined cubes six to eight lines square, and having a pearly lustre; it has a pungent, saline taste, but is inodorous.

CHEMICAL PROPERTIES.—It is composed of one equivalent of potassium and one of iodine, K I. It does not deliquesce when pure, unless there is much moisture in the atmosphere; exposed to heat it decrepitates, and fuses at a red heat, but is not decomposed. 100 parts of water at 64° dissolve 143 parts of the salt: it is soluble in 5 or 6 parts of alcohol. The watery solution is neutral when pure, it possesses the property of dissolving iodine in large quantity, forming a brown liquid called *ioduretted iodide of potassium*.

Adulterations.—Iodide of potassium, as met with in the form of large cubical crystals, seldom contains any impurity. Formerly when it was not so carefully crystallized, it was very frequently adulterated with carbonate of potash. This fraud is readily detected by the alkalinity of the specimen, by its being deliquescent, and by its giving white precipitates with nitrate of baryta or with lime-water. Water is sometimes present as an impurity, it may be detected by drying the salt and ascertaining the loss of weight. If the salt contain *iodate of potash*, it becomes of a pinkish colour and emits an odour of iodine when kept for some time; its presence may be readily detected by adding tartaric acid to a solution of the salt, if any iodine be present, free iodine will be immediately developed. The freedom from chloride of potassium or of sodium, impurities not unfrequently met with, is best ascertained by the following test:—"A solution of gr. v. in f℥j. of distilled water, precipitated by an excess of solution of nitrate of silver, and then agitated in a bottle with a little aqua ammoniæ, yields quickly by subsidence a clear supernatant liquid, which is not altered by an excess of nitric acid, or is rendered merely hazy," *Edinburgh Pharmacopœia*. It has latterly been much adulterated with bromide of potassium, owing to the high price of iodine; the adulteration must be, however, looked on as one of no importance, if, as I have already stated my opinion, their medicinal action be identical.

THERAPEUTICAL EFFECTS.—Iodide of potassium is in many respects analogous in its operation to iodine; but it frequently produces very different physiological and therapeutical effects. Like

iodine it is taken into the circulation, and may be detected in the different secretions and excretions, even several days after it has been swallowed. In some individuals iodide of potassium when given even in very small doses produces swelling of the face and tongue, followed by ptyalism, and this effect I have seen produced in one individual who had not taken more than ten grains of the salt. While on the other hand, many have continued its use for months without the production of iodism, or any other physiological effect whatever. In the different varieties of scrofula and in bronchocele, iodide of potassium is generally given in combination with iodine, the beneficial effects of which in these diseases it seems to increase much. In secondary syphilitic affections, few remedies are so much employed in the present day, or with so much benefit, as iodide of potassium: it is peculiarly adapted for those cases in which mercury has been administered in large quantity in the primary stage, or where the individual is of a scrofulous habit. The particular forms of secondary syphilis in which it is of most service are, sore throat, nodes, caries and other diseases of the bones, and the tubercular eruptions of the skin. This salt has also been employed with much benefit in the treatment of articular rheumatism, in chronic rheumatism with alteration of structure, in lumbago, in sciatica, in periostitis, in dropsy, in amenorrhœa, in leucorrhœa, in chronic induration and enlargement of various organs, &c. I have already when speaking of the therapeutical effects of iodine referred to the efficacy of its salts in the treatment of cutaneous diseases; and it is from the iodide of potassium especially, that I have derived the most beneficial results; in the various forms of psoriasis and lepra,* in ichthyosis and in lupoid ulcerations, my experience of it is highly favourable, and I have frequently seen recovery follow its use in cases in which arsenic had failed to produce any amendment. The external use of iodide of potassium in the form of ointment or of bath, is usually advantageously combined with its internal administration. Professor Melsons of Brussels has proposed the use of iodide of potassium to remove the discoloration of the skin, which is sometimes consequent on the internal employment of nitrate of silver, (see page 425), but as yet his views have not been sufficiently tested practically; he gives it in enormous doses, half a drachm or even more, three times daily, and exposing the patient at the same time to a hot vapour bath, he brings the iodine to the surface when it may readily be detected in the perspiration.

DOSE AND MODE OF ADMINISTRATION.—Gr. iii to gr. xv. three times a day; some physicians prescribe it in very large doses, 3j. to 3vj. in the 24 hours, in which quantity it is said not to produce any sensible effects. My own experience, however, is in favour of small doses, four or five grains daily, continued for a long time. It is best administered simply dissolved in water and sweetened with syrup; or in some bitter infusion or decoction, as in infusion of quassia, or

* See Dublin Quarterly Journal of Medical Science; New Series, vol. viii. p. 240.

decoction of elm bark. The power of the solution of dissolving iodine has been before referred to.—*Liquor Potassii Iodidi compositus*, D. L. *Iodinei Liquor compositus*, E. (Iodide of potassium, gr. x. (3j., E.); pure iodine, gr. v. (3ij., E.); distilled water, Oj. (f3xvj., E.); mix and (with the aid of a gentle heat and agitation, E.) dissolve). Dose f3j. to f3ss.—E. min. v. to min. xv. It may be further diluted with water.—*Tinctura Iodinii composita*, D. L. (Pure iodine, 3ss.; iodide of potassium, 3j.; rectified spirit, Oj.; dissolve, [macerate until they are dissolved and strain, L.]). Dose, min. x. to min. xxx. in f3j. of any aromatic water, or in white wine.—*Unguentum Potassii Iodidi*, D. (Take of iodide of potassium, one drachm; distilled water, half a drachm; ointment of white wax, seven drachms. Triturate the iodide of potassium with the water, then add the ointment, and rub them well together). This ointment may be preserved unchanged for months by the addition of a few drops of caustic potash; this addition will also restore the white colour to an ointment which has already become yellow.—*Unguentum Iodinii compositum*, L. *Unguentum Iodinei*, E. ("Iodine, 3ss.; iodide of potassium, 3j.; rectified spirit, f3j.; lard, 3ij.; first rub the iodine and iodide of potassium with the spirit, then mix with the lard," L. The *Edinburgh College* omits the spirit, but uses the same proportions of the other ingredients). About the size of a nut of this ointment should be rubbed into the affected part twice or three times a day.

INCOMPATIBLES.—Acids; and acidulous and metallic salts.

SULPHUR IODATUM, D. *Iodated Sulphur* ; *Iodide of Sulphur*.

PREPARATION.—*Dublin*.—Take of pure iodine, in powder, one ounce; sublimed sulphur, two drachms: mix the iodine and sulphur by trituration in a mortar, and, having transferred the powder to a Florence flask, heat it gently till fusion is effected. When the flask has cooled, let it be broken in order to the withdrawal of the product, which should be immediately enclosed, and preserved in a well-stopped bottle.

PROPERTIES.—This compound is met with in brownish plates, with a radiated crystalline structure. It has a strong odour of iodine, and an acrid taste. Its elements are easily disunited, the iodine entirely escaping when it is left exposed to the air. Its composition is probably $S^2 I$.

THERAPEUTICAL EFFECTS.—Iodide of sulphur has not been much used internally in medicine; its effects resemble those of iodine; the dose of it is from gr. j. to gr. iij. three times daily in pill. Externally in the form of ointment, it has been employed with much success in the treatment of obstinate cutaneous diseases, particularly lupus, porrigo, acne indurata, herpes, and lepra. My own experience of it in chronic lichenoid eruptions, in the local forms of psoriasis and in acne indurata, is very favourable. The ointment is prepared by rubbing together from gr. xv. to gr. xxxvj. of the iodide and 3j. of lard, or white-wax ointment.

INCOMPATIBLES.—Acids; acidulous, and metallic salts.

CHAPTER XXI.

TONICS.

(Corroborants.)

TONICS are substances, the continued administration of which, in debilitated and relaxed conditions of the body, imparts strength and vigour without producing any sudden excitement. Tonics to a certain extent are stimulants, inasmuch as they arouse the vital energies, but the excitement is slowly produced, and the effect is permanent; if, however, they are given when the system is in a healthy state, their primary action, like that of stimulants, is followed by collapse. This, then, is another example of how necessary it is to remember that medicines are but relative agents, their effects being almost entirely dependant on the state of health or disease in which they are administered. There is no class of remedial agents which requires more discrimination in their administration than Tonics; nor any, the injudicious use of which more frequently produces evil consequences. The diseases in which these remedial agents are principally employed, must manifestly be those of diminished power; in no case, however, should they be prescribed where there is tendency to irritation or inflammation of the digestive organs, or where the secretions are in a depraved state, without the previous use of means calculated to remove the former or correct the latter; to effect which, the employment of mild purgatives will, in most instances, be found best adapted. They are also indicated in some diseases which are inflammatory in their nature, such as erysipelas, diffuse inflammation and relative affections, when they assume, as they so frequently do, a typhoid type or are presented in asthenic habits. Tonics have a marked action on the various organs of secretion, their effects being to restore them to a healthy state; they are consequently administered with the view of diminishing secretion when it is excessive or of restoring it when deficient, if either condition depends, as it often does, on inertia or want of tone in the secreting organ. They thus frequently act as diuretics, laxatives, emmenagogues, &c. Independently of their tonic properties, some of the remedies contained in this class possess a specific power in ague and other periodical diseases, and hence have been denominated

Febrifuges; as examples, I may refer to cinchona bark, arsenic, &c. As already remarked, most astringents act as tonics, (see page 45).

ACIDUM MURIATICUM DILUTUM, D. E. ACIDUM HYDROCHLORICUM DILUTUM, L. *Dilute Muriatic (Hydrochloric. L.) acid.*

PREPARATION.—*Dublin*.—"Take of pure muriatic acid, four fluid ounces; distilled water, thirteen ounces: mix. The specific gravity of this acid is 1045." *London*. *Edinburgh*.—"Hydrochloric (muriatic, E.) acid, f℥iv.; distilled water, f℥xij.; mix."

Hydrochloric acid (described in the division *Caustics*), properly diluted, acts as a tonic, and as such is employed in those forms of fever which were formerly supposed to depend on a putrescent condition of the fluids of the body, as in petechial fevers, malignant scarlatina, phagedenic ulceration of the throat, scurvy, &c. It is also an excellent tonic in debility of the digestive organs, particularly when attended with a deposit of phosphates from the urine, and in that state of the alimentary canal which favours the generation of worms. Independently of its action as a caustic, dilute hydrochloric acid is an excellent addition to gargles in ulcerated sore throat, when there is no tendency to inflammation present; it is also employed with much advantage in the sore throat of scarlatina.

DOSE AND MODE OF ADMINISTRATION.—f℥ss. to f℥j. The dilute acid of the last edition of the Dublin Pharmacopœia is weaker than that of the previous edition, being now nearly of the same strength as that of the other colleges. It should be administered largely diluted with some bitter infusion, as infusion of quassia, or it may be substituted for sulphuric acid in preparing the infusion of roses; f℥j. to f℥ij. may be added to an eight ounce gargle.

INCOMPATIBLES.—Alkalies; tartar emetic; tartrate of potash; nitrate of silver; acetate of lead; and all carbonates.

ACIDUM NITRICUM DILUTUM, D. L. E. *Dilute Nitric acid.*

PREPARATION.—*Dublin*.—"Take of pure nitric acid, four fluid ounces; distilled water, twenty-nine ounces: mix. The specific gravity of this acid is 1092." *London*.—"Nitric acid, f℥j.; distilled water, f℥ix.; mix." *Edinburgh*.—"Mix together f℥ix. of distilled water and f℥j. of pure nitric acid, or f℥j. f℥vss. of commercial nitric acid. Density, 1077."

Nitric acid (described in the division *Caustics*), properly diluted acts as a general tonic, but its powers as such are less manifest than those of the other mineral acids. It is principally used internally in the treatment of chronic hepatitis, in affections consequent on the excessive administration of mercury, and in secondary syphilitic diseases. In syphilis it has been proposed as a substitute for mercury, but its beneficial influence appears to be limited to those cases in

which scrofula or very great debility forbids the use of that medicine, but which, as has been so ably shown by the late Mr. Colles of this city, are very few in number, and frequently depend rather on its injudicious administration.

DOSE AND MODE OF ADMINISTRATION.—f3ss. to f3j. The dilute acid of the Dublin college is now of nearly the same strength as that of the other Pharmacopœias. It may be administered in the same form as hydrochloric acid; but it is most usually given in the compound decoction of sarsaparilla.

INCOMPATIBLES.—Alcohol; alkalies; oxides; earths; sulphate of iron; acetate of lead; acetate of potash; and all carbonates, and sulphurets.

ACIDUM NITROMURIATICUM, D. *Nitromuriatic acid; Aqua regia.*

PREPARATION.—“Take of pure nitric acid, one fluid ounce; pure muriatic acid, two fluid ounces: mix in a green glass bottle, furnished with an accurately ground stopper, and keep in a cool place.”

PROPERTIES.—This liquor has a deep yellow colour, an intensely acid taste, and exhales an odour both of chlorine and nitrous acid. It is a solution of chlorine and of nitrous acid in water, ($\text{Cl NO}^4\text{HO}$). Its most remarkable property is its power of dissolving the metals gold and platinum, by which it may be readily distinguished from other acids.

THERAPEUTICAL EFFECTS.—This preparation was at one time employed internally in the same cases as nitric acid; but at present it is only used externally in the form of bath. Thus employed, it is a very useful remedy in chronic induration or abscess of the liver, in chronic cutaneous diseases, and in syphilitic or mercurial cachexia. When its employment has been continued for some time, it frequently causes salivation, which is to be regarded as evidence of its sanatory influence.

DOSE AND MODE OF ADMINISTRATION.—Internally, gtt. x. to gtt. xx. largely diluted.—*Balneum Acidi Nitromuriatici*, (Nitromuriatic acid, f3ivss.; water, cong. iij.; mix in a wooden vessel). This is to be used daily in the form of a foot-bath; the feet should be kept in the bath for from 15 to 20 minutes, and afterwards rubbed well with flannels. Dr. Scott of Bombay affirms that this bath operates like a charm, and produces immediate ease, when employed during the passage of biliary calculi through the duct.

ACIDUM PHOSPHORICUM DILUTUM, L. *Diluted Phosphoric Acid.*

PREPARATION.—*London*.—Phosphorous, 3j.; nitric acid, f3iv.; distilled water, f3x.; add the phosphorous to the nitric acid mixed with the water in a glass retort placed in a sand-bath, then apply heat till f3viiij. are distilled. Put these again into

the retort that f℥viii. may distil, which are to be rejected; evaporate the remaining liquor in a platinum capsule, until only ℥ij. 3vj. remain. Lastly, add to the acid when it is cold, as much distilled water as may be sufficient to make it accurately measure f℥xxviii.

PHYSICAL PROPERTIES.—This is a colourless, inodorous, transparent liquid, with an intensely acid taste. Its density is 1.064 at 62° F.

CHEMICAL PROPERTIES.—It is a solution of phosphoric acid (PO^5) in water; the London preparation containing 10.5 per cent. of acid. It possesses the usual characteristics of a mineral acid. "Chloride of barium or nitrate of silver being added, whatever is thrown down is readily dissolved by nitric acid. Strips of copper or silver are not all acted upon by it, nor is it coloured when hydrosulphuric acid is added; 42 grains of carbonate of soda are saturated by 100 grains of this acid, and nothing is thrown down," *London Pharmacopœia*.

THERAPEUTICAL EFFECTS.—Diluted phosphoric acid possesses the tonic properties of the other mineral acids, and may be employed in cases of debility of the digestive organs, and in general cachexia. It is particularly adapted for those cases in which there is a deposit of phosphates from the urine; the earthy phosphates being soluble in an excess of their own acid. It has also been used, and it is stated, with much benefit in cases of unusual depositions of phosphate of lime, as in exostosis, or in the formation of bony tumours; and largely diluted as a common drink in diabetes. Diluted phosphoric acid is, however, not much used.

DOSE AND MODE OF ADMINISTRATION.—Min. xx. to f℥j. properly diluted.

INCOMPATIBLES.—Lime water; calcareous salts; carbonate of soda; and strychnia.

In cases of poisoning with this acid, the same treatment should be followed as in poisoning with hydrochloric acid, (see page 138).

ANTHEMIS, L. E. CHAMÆMELUM, D. *Chamomile*; *The (single, L. E.) flowers of Anthemis nobilis*.—Indigenous; belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley,) and to the Linnæan class and order *Syngenesia Superflua*.

BOTANICAL CHARACTERS.—Stem, about a foot long, procumbent; Leaves, bipinnate, a little downy; Branches, numerous, each branch terminated by a single flower, whose disk is yellow, at length conical, and ray white.

PHYSICAL PROPERTIES.—Chamomile flowers have a strong, peculiar, rather agreeable odour, and an aromatic bitter taste.

CHEMICAL PROPERTIES.—Their most important chemical constituents are bitter extractive and volatile oil. The latter, *Oleum Anthemidis*, D.L.E., is obtained by the usual process of distillation. It is of a greenish-blue colour, and has the peculiar odour and the

aromatic taste of the flowers. One cwt. of flowers yields from f3iss. to f3ij. of the oil. Its specific gravity is 0.9083. It contains a hydrocarbon, and an oxidated oil, the last of which treated with potash infusion gives *valerianic acid*, (Gerhardt and Cahours). Chamomile flowers yield their active properties to both water and alcohol. The single variety of the chamomile flower should be preferred for medical purposes.

THERAPEUTICAL EFFECTS.—Chamomile is an aromatic and bitter tonic. It was formerly in high esteem as a remedy for intermittent fever, but its employment as an internal medicine is at present restricted to those forms of dyspepsia which depend on debility or want of tone of the digestive organs; in which cases it is exceedingly useful. A concentrated infusion produces vomiting, and was consequently at one time much used to aid the action of emetics. Chamomile flowers are commonly employed for preparing warm fomentations. A strong infusion, applied cold two or three times a day is an excellent application, in simple weakness of the eyes, and in the milder forms of hemorrhoidal discharges.

DOSE AND MODE OF ADMINISTRATION.—The powder is not administered, the dose would be from 3ss. to 3ij.; the dose of the oil is from min. iij. to min. viij.—*Infusum Anthemidis*, D.L.E. (“Take of Chamomile flowers, dried, half an ounce; boiling water, twelve ounces: Infuse for fifteen minutes, in a covered vessel, and strain. The product should measure about eight ounces.” D.—“Chamomile, 3v.; boiling water (distilled, L.), Oj.; infuse for ten minutes in a covered vessel, and strain.” L. E.) If taken warm it produces vomiting. The dose of the cold infusion is f3j. to f3ij.—*Extractum Anthemidis*, E. (Chamomile ʒj.; boil it with cong. j. of water to Oiv.; filter hot; evaporate in the vapour bath to the right consistence.) The volatile oil is dissipated in the preparation of this extract, but it is an excellent bitter tonic; Dose, gr. x. to 3ss.

INCOMPATIBLES.—*With the infusion*; the mineral acids; sesquisalts of iron; sulphate of copper; nitrate of silver; acetate of lead; and corrosive sublimate.

ARGENTI CHLORIDUM. *Chloride of Silver.* This salt is readily obtained by the double decomposition of solutions of nitrate of silver and of chloride of sodium. When first precipitated it is white, but on exposure to light soon acquires a dark brown, almost black colour. It is insoluble in water or in alcohol, and is void of odour and taste.

THERAPEUTICAL EFFECTS.—It has been employed both in America and on the Continent as a substitute for the nitrate of silver in the treatment of diseases. It has also been used with success as a remedy in primary and secondary syphilitic affections. It is stated not to produce the discoloration of the skin caused by the nitrate; but from its limited employment hitherto, I do not think that such a conclusion can be depended on; the more especially as it is

admitted by all that the nitrate of silver is converted into the chloride immediately on its being taken into the stomach.

DOSE AND MODE OF ADMINISTRATION.—Gr. iij. four or five times daily, made into pill with conserve of roses or extract of liquorice.

ARGENTI NITRAS. *Nitrate of Silver* (described in the division *Caustics*), may be administered internally in much larger doses than might *a priori* be supposed from its caustic action when applied to the surface of the body; from which it would appear to be decomposed by the free acids of the stomach. Nevertheless, when taken in large quantity, it acts as a powerfully corrosive poison. In small but frequently repeated doses, this salt is an excellent tonic, and also appears to have a specific influence over some convulsive disorders. As a tonic, it is one of the best that can be employed in the early stages of tubercular phthisis; in chronic affections of the stomach, especially where there is morbid sensibility of the gastric and intestinal nerves; and in angina pectoris. The principal convulsive disorders in which nitrate of silver has been used are epilepsy and chorea, in both of which it proves very frequently successful, perhaps more so than any other remedy. Its administration must, however, be persevered in for a very long time; and this is attended with a very serious disadvantage, and one which has brought this remedy into great disrepute, namely, the communication of an indelible and permanent leaden or bluish-grey hue to the skin over the whole body. Various attempts have been made to account for this phenomenon, but none are at all satisfactory to my mind; it is certain that this consequence has occurred so frequently (I have myself seen several instances of it), and is of so disagreeable a nature, as to more than counterbalance its remedial powers.

DOSE AND MODE OF ADMINISTRATION.—1-6th of a grain gradually increased to gr. ij. or gr. iij. three times a day; in some instances so large a dose as gr. xv. have been taken. It is best administered in the form of pill, as the solution blackens the skin wherever it touches it, and also acts more energetically on the stomach. The pills should be made with some vegetable extract, as extract of gentian or of liquorice; crumb of bread is frequently ordered for this purpose, but it contains chloride of sodium which decomposes nitrate of silver. The most certain method to prevent the discoloration of the skin, is not to continue the use of the medicine too long. The late Dr. James Johnson, of London, states, "that there is no instance on record where the complexion has been affected by the medicine when restricted to three months administration." Dr. A. T. Thompson suggested the combined use of dilute nitric acid to prevent the decomposition of the nitrate; and more recently, Dr. Patterson, of Rathkeale, has proposed the employment

of the iodide (prepared by precipitating a solution of nitrate of silver with a solution of iodide of potassium), instead of the nitrate of silver, which he asserts is equally efficacious as a remedy without possessing this great disadvantage. The plan of treatment proposed by Dr. Melsons, of Brussels, for removing the discoloration when it has occurred has before been referred to (page 418).—*Liquor Argenti nitratis*, L. E. (Nitrate of silver, 3j. (gr. xl. E.); distilled water, f3j. (gr. 1600, E.); dissolve the nitrate of silver in the water, (and strain; then the access of light being prevented, L.), keep the solution in well closed bottles). Used only as a test.

INCOMPATIBLES.—Spring and river water; the alkalies, and their carbonates; lime water; hydrochloric, sulphuric, phosphoric, tartaric, and hydrocyanic acids, and their soluble salts; iodide of potassium; solution of arsenite of potash; solution of soap; and astringent vegetable infusions.

In poisoning with nitrate of silver, the best antidote that can be employed is common salt; its administration should be followed by demulcent drinks, and if inflammatory symptoms arise, the usual antiphlogistic means.

ARGENTI OXYDUM, D. *Oxide of Silver.*

PREPARATION.—“Take of nitrate of silver, half an ounce; lime water, half a gallon, or a sufficient quantity; distilled water, half a pint. Dissolve the nitrate of silver in four ounces of the distilled water, and having poured the solution into a bottle containing the lime-water, shake the mixture well and then set it by till the sediment subsides. The supernatant solution being drawn off, let the sediment be placed upon a filter, and, when washed with the remainder of the distilled water, let it be dried at a heat not exceeding 212°, and preserved in a bottle.”

PHYSICAL PROPERTIES.—Oxide of silver when first precipitated is an olive brown powder which becomes darker coloured when dried; it is odourless and tasteless, its specific gravity is 7.143.

CHEMICAL PROPERTIES.—It is composed of one equivalent of metallic silver, and one of oxygen (Ag. O). It is slightly soluble in water, the solution acting on vegetable colours feebly alkaline; it is freely soluble in solution of caustic-ammonia with which it forms a highly explosive compound. Oxide of silver is readily resolved by heat, or by prolonged exposure to light into oxygen gas, and metallic silver.

THERAPEUTICAL EFFECTS.—This preparation has been employed within the last few years in the same cases as the nitrate of silver, over which it does not appear to me to possess any advantages, certainly, none sufficient to warrant its introduction into the last edition of the Dublin Pharmacopœia. It has been chiefly recommended as a remedy in menorrhagia. As a local application oxide of silver has been applied in the form of ointment by means of a bougie to the urethra in gonorrhœa.

DOSE AND MODE OF ADMINISTRATION.—In pill gr. ss. to. gr. ij.

three times a day. To prepare an ointment of it 3j. may be combined with 3j. of lard.

ARSENICUM ALBUM. *Arsenic* (described in the division *Caustics*) is a powerful irritant poison, a few grains being sufficient to occasion death. Its effects when taken in poisonous doses vary remarkably; in some instances the most prominent symptoms are those of inflammation of the gastro-intestinal membrane; while in others, coma and extreme depression of the circulation are most marked. When administered in minute doses for a short period, it appears to act as a general tonic, without producing any remarkable physiological effect; but, if its use be long continued, or the doses given be too large, it acts as a slow poison. In medicine, it has been principally used internally as an *anti-periodic*, in the treatment of ague, and of other diseases of an intermittent type, as in some forms of neuralgia, chorea, and periodic head-ache; and its employment in these affections is often attended with the most beneficial results, more especially in cases in which quina either disagrees with the patient or fails to cure the disease. In chronic cutaneous diseases, particularly those of a scaly character, and those which affect the scalp, arsenic is generally given in combination with iodine (see pages 380 and 408), it is, however, often prescribed alone, with excellent effect. It has also been employed as an internal remedy, in epilepsy; in chronic rheumatism, especially when attended with change of structure in the joints; in passive dropsy; in secondary syphilis; in lupus, &c.

DOSE AND MODE OF ADMINISTRATION.—The employment of arsenic as a remedy requires great caution, and its effects must be carefully watched; it may be administered in substance in doses of from 1-16th to 1-8th of a grain made into pill with crumb of bread; but, in consequence of the great difficulty of accurately dividing so small a quantity into pills, the following preparation is generally preferred:—*Liquor Arsenicalis*, D. E. *Liquor Potassæ Arsenitis*, L. ("Take of pure arsenious acid; pure carbonate of potash, of each eighty-two grains; compound tincture of lavender, half a fluid ounce; distilled water, as much as is sufficient. Introduce the arsenious acid and carbonate of potash into a flask containing half a pint of water, and boil until a perfect solution is obtained. When this has cooled, add to it the compound tincture of lavender, and as much water as will make the bulk of the entire one pint. The specific gravity of this solution is 1013," D.—"Arsenic powdered (broken into small fragments, L.); and carbonate of potash, of each, gr. lxxx.; compound tincture of lavender, fʒv.; distilled water, Oj.; boil the arsenic and carbonate of potash with half the water in a glass vessel till they are dissolved, (filter if necessary, E.); add the spirit of lavender to the cooled liquor; and then, sufficient distilled water, till the whole measures Oj.," L.E.). One fluid drachm of this preparation, commonly known as Fowler's solution, contains gr. ss. of arsenious

acid; the preparation of the Dublin College is a little stronger. Dose, min. v. to min. x. two or three times a day.—*Arsenical solution*, DEVERGIE. (Arsenic; and carbonate of potash, of each gr. ij.; distilled water, f3xvj.; tincture of cochineal, sufficient to colour it; mix). Every fluid ounce contains 1-8th of a grain of arsenic. The advantage it possesses over Fowler's solution is that the preparation being so much weaker and consequently the dose so much larger, dangerous accidents from an over dose are not so likely to occur. Either solution is incompatible in prescription with acids, lime water, chloride of calcium, sulphate of magnesia, sulphate of iron, sulphate of copper, alum, iodide of iron, nitrate of silver, infusion and decoction of bark, &c.—*Pilulæ Asiaticæ*, (Arsenious acid, 3j.; black pepper, 3ix.; liquorice root powdered; and mucilage, of each, q. s.; mix and divide into 800 pills). This combination is highly praised in the East Indies as a remedy for elephantiasis, lepra, psoriasis, and syphilitic eruptions. Each pill contains about 1-13th of a grain of arsenious acid; Dose, one or two daily.—*Ioduretted Solution of the Iodide of Potassium and Arsenic*, AUTHOR. (Arsenical solution, min. lxxx.; iodide of potassium, gr. xvj.; pure iodine, gr. iv.; syrup of orange flowers, f3ij.; dissolve). Every drachm of this solution contains five minims of arsenical solution, a grain of iodide of potassium, and a fourth of a grain of iodine; it may be administered in a wine-glass full of water, and being very agreeable to the taste, is easily taken even by children. I have used it very extensively in the treatment of obstinate cutaneous diseases with excellent results; it is of a rich wine yellow colour, and keeps unchanged for months.

In poisoning with arsenic, if the stomach-pump be at hand it should be immediately used, and the stomach repeatedly washed out with tepid water, in which the hydrated sesquioxide of iron is suspended. The mode of preparing this substance which is the best antidote for arsenic, and the manner in which it is to be used will be described hereafter. In the absence of the stomach-pump, emetics of sulphate of zinc or sulphate of copper should be administered, and vomiting promoted by demulcent drinks. Magnesia has also been recently proposed as an antidote for arsenic; from the observations of Christison it appears that dense or *heavy* magnesia possesses little or no action on it, but magnesia in a gelatinous state, or the *light* magnesia at present pretty generally manufactured, removes arsenic from its solution in water. If light calcined magnesia be used as an antidote in cases of poisoning with arsenic, it should be administered in the proportion of between thirty and fifty parts to one of the poison.

AURANTII CORTEX, L. E. CITRUS BIGARADIA, FRUCTUS TUNICA EXTERIOR ET OLEUM VOLATILE, D. *Bitter-orange rind (and volatile oil, D.) The rind of the fruit and the volatile oil of Citrus*

bigaradia, D. The outer rind of the fruit of *Citrus vulgaris* (Risso), L. E. The three British Colleges intend to refer the officinal products to the bitter-orange tree, which has been only lately separated as a distinct species from the *Citrus aurantium* (described in the division *Refrigerants*). It differs, in being a smaller tree with more distinctly winged leaf-stalks, in the bitterness of the pulp, and the greater aroma of the rind of the fruit.

PROPERTIES.—The rind of the Seville or bitter-orange is cut into narrow pieces and dried, the inner white part having been previously removed. It is in rugged, uneven slices, of a dark orange-yellow colour; it has a peculiar fragrant odour, and a warm, bitter taste, both of which depend on a volatile oil which exists in concave minute vesicles. This oil, which is an article of the *Materia Medica* in the Dublin Pharmacopœia, is prepared on the Continent both by expression and distillation; its composition is $C^{10}H^8$, being isomeric with oil of turpentine. Bitter orange-peel yields its aroma and taste to both water and alcohol. The leaves are aromatic and bitter, they are used on the Continent, but at present are not employed in this country.

Adulterations.—The rind of the sweet orange is often substituted for that of the bitter orange. It does not possess the peculiar aroma of the latter; the sophistication may readily be detected by the vesicles in which the volatile oil is contained being convex in the sweet, and concave in the bitter orange.

THERAPEUTICAL EFFECTS.—Bitter orange peel and leaves are feebly tonic. They are employed in medicine principally for their agreeable flavour. The following preparations are officinal.—*Infusum Aurantii compositum*, D. L. *Infusum Aurantii*, E. (“Take of bitter orange peel, dried, three drachms; cloves, bruised, half a drachm; boiling water, half a pint: infuse for half an hour, in a covered vessel; and strain. The product should measure about eight ounces.” D.—“Orange peel, dried, ʒss.; lemon peel, fresh, ʒij.; cloves bruised, ʒj.; boiling water (distilled, L.), Oj. Digest for 15 minutes in a vessel lightly covered, and strain, (through linen or calico, E.)” L. E.). Dose, fʒj. to fʒij.; chiefly used as a vehicle for other medicines.—*Confectio (Conserva, E.) Aurantii*, L. E. (“Fresh orange peel, separated by a rasp, lbj.; sugar lbij.; bruise the rind with a wooden pestle in a stone mortar; then the sugar being added, again pound them until they are thoroughly incorporated,” L.—“Grate off the outer rind of bitter oranges, and beat it into a pulp, adding gradually thrice its weight of white sugar,” E.). An agreeable flavouring adjunct to electuaries, syrups, &c.; it possesses stomachic and tonic properties. Dose, ʒij. to ʒj.—*Syrupus Aurantii*, D. L. E. (“Take of bitter orange peel, dried, two ounces and a half; boiling distilled water, one pint; refined sugar, in powder, as much as is sufficient: infuse the orange peel in the water, in a covered vessel, for twelve hours, and strain without expression; then add to the liquor twice its weight of sugar, and dissolve it with the aid of a steam or water heat.” D.—“Fresh orange peel, ʒiiss.; boiling water, Oj.;

pure sugar, ℥iij.; macerate the peel in the water for 12 hours in a vessel lightly covered; and then add the sugar to the liquor (filtered, and dissolve with the aid of heat, E.)" L. E.). A mild stomachic, used for flavouring. It may be prepared extemporaneously by adding fʒj. of the tincture to Oj. of simple syrup. Dose, fʒij. to fʒss. This syrup is not at all so agreeable as that prepared with orange flowers, which may be made by adding a sufficiency of sugar to orange flower water.—*Tinctura Aurantii*, D. L. E. (Bitter orange peel, dried, ʒiv. (ʒiiiss., L. E.); proof spirit, Oij.; macerate for 14 (7, E.) days (strain, express, D.) and filter. "This tincture may be made by percolation, by cutting the peel into small pieces, macerating it in a little of the spirit for 12 hours, and beating the mass into a coarse pulp before putting it into the percolator," E.). Dose, fʒj. to fʒij.

INCOMPATIBLES.—The salts of iron; and lime water.

BARI CHLORIDUM, D. L. BARYTÆ MURIAS, E.—*Chloride of Barium. Muriate of Baryta.*

PREPARATION.—*Dublin*.—"Take of carbonate of barytes, coarsely powdered, ten ounces; pure muriatic acid, eight fluid ounces; distilled water, as much as is sufficient. Dilute the acid with a pint and a half of the water, add the carbonate of barytes, and, when effervescence has ceased, evaporate to dryness. Transfer the residue to a Hessian crucible, and having exposed it to a low red heat for twenty minutes, suffer it to cool, then reduce it to a coarse powder, and boil it for ten minutes with a pint and a half of water. Pour off the solution, boil the undissolved residue with ten additional ounces of water, and again decant. Pass the decanted solutions through a paper filter, and having evaporated the resulting liquid to the bulk of about fourteen ounces, suffer it to cool, that crystals may be formed. The mother liquor, by further evaporation and cooling, will yield additional crystals. Or, Take of sulphate of barytes, one pound and a half; lamp-black, four ounces; pure muriatic acid fourteen fluid ounces; distilled water, a sufficient quantity. Heat the sulphate of barytes in a covered crucible, and, while red hot, throw it into distilled water. Let it now, after being reduced to a very fine powder in the manner directed in the formula for *Creta Præparata*, be mixed intimately with the lamp-black, and exposed in a Hessian crucible for two hours to a strong red heat. The crucible being removed from the fire and permitted to cool, its contents are to be reduced to a coarse powder, and boiled for fifteen minutes with two quarts of water, after which the solution is to be poured off on a paper filter. The undissolved residuum is to be again boiled with one quart of water, and the resulting liquor decanted on the same filter. To the filtered solutions, placed in a large capsule beneath a flue with a good draught, let the muriatic acid be gradually added, as long as it produces effervescence, and then, by means of a sand heat, evaporate to dryness. Boil the residuum with two quarts of water, pass the solution through a paper filter, and having evaporated it down to one quart, suffer it to cool that crystals may be formed. By further concentration the mother liquor will yield additional crystals." *London*.—"Carbonate of barytes broken into small fragments, ʒx.; hydrochloric acid, Oss.; distilled water Oij.; mix the acid with the water, and add the carbonate gradually. Then, heat being applied, and the effervescence finished, strain, and boil down the liquor, that crystals may be formed." *Edinburgh*.—"First process, same as directed by the London College. Or, sulphate of baryta, lbj.; charcoal in fine powder, ʒij.; pure muriatic acid, a sufficiency; heat the sulphate to redness; pulverize it finely when cold, and mix it intimately with the charcoal; subject the mixture to a low white heat for three hours in a covered crucible, pulverize the product, put it gradually into Ov. of boiling water, and boil for a few minutes; let it rest for a little over a vapour-bath;

pour off the clear liquor, and filter it if necessary, keeping it hot. Pour Oij. of boiling water over the residuum, and proceed as before. Unite the two liquors, and while they are still hot, or if cooled, after heating them again, add pure muriatic acid gradually so long as effervescence is occasioned. In this process the solutions ought to be as little exposed to the air as possible; and in the last step, the disengaged gas should be discharged by a proper tube into a chimney, or the ash-pit of a furnace. Strain the liquor, concentrate it, and set it aside to crystallize."

PHYSICAL PROPERTIES.—This salt crystallizes in flat four-sided tables, bevelled at the edges. It is colourless and transparent; odourless; with an acrid, bitter taste. Specific gravity, 3.097.

CHEMICAL PROPERTIES.—Chloride of barium is composed of one equivalent of barium, one of chlorine, and two of water of crystallization, $Ba\ Cl + 2HO$. It is permanent in ordinary states of the atmosphere, but in very dry air effloresces slightly. It is fused by a strong heat; is soluble in about twice its weight of temperate and in somewhat less of boiling water; it is said to be soluble in 400 parts of absolute alcohol. Sulphuric acid and the soluble sulphates produce a heavy white precipitate, insoluble in nitric acid, with a solution of this salt.

Adulterations.—As met with in the shops, this salt is very seldom adulterated. The Edinburgh College has given the following test, by which the freedom from any impurity may be readily ascertained:—"100 grains in solution are not entirely precipitated by 100 grains of sulphate of magnesia."

THERAPEUTICAL EFFECTS.—Chloride of barium was at one time much employed in scrofulous diseases, and in chronic glandular enlargements, in consequence of its supposed tonic and deobstruent properties. In the present day it has fallen almost completely into disuse. In large doses, (an ounce or more), it is a narcotico-acrid poison.

DOSE AND MODE OF ADMINISTRATION.—It is used only in solution.—*Liquor Barii chloridi*, D. L. *Solutio Barytæ muriatis*, E. (Chloride of barium, \mathfrak{zj} . ($\mathfrak{3j}$., L. E.); distilled water, $\mathfrak{3viii}$. ($\mathfrak{f3j}$., L. E.); dissolve the salt in the water (and filter through paper, D.). "Specific gravity 1088," D.) Dose, min. v. to min. x. properly diluted. It is much employed as a test for detecting the presence of sulphuric acid and the sulphates.

INCOMPATIBLES.—Sulphuric acid; sulphates; carbonates; and phosphates.

In poisoning with this salt, the best antidotes are the soluble sulphates, as sulphate of magnesia or sulphate of soda.

BEBEERINÆ SULPHAS. *Sulphate of Bebeerina.* Bebeerina is the active principle of BEBEERU—the bark of *Nectandra Rodiei*, the Green-heart tree of Demerara and of British Guiana, which belongs to the Natural family *Lauraceæ*, and to the Linnæan class and order *Dodecandria Monogynia*. This principle is also found in much larger quantity in the fruit of the same tree.

PREPARATION.—The exact steps followed in its preparation have not been published, but the process is similar to that followed for the preparation of sulphate of quina from cinchona bark.

PROPERTIES.—It occurs in small tabular, shining crystals, of a reddish-brown colour, void of odour, with a strongly astringent taste. According to Dr. Douglas Maclagan's analysis of the commercial salt, it is a basic sulphate, being composed of 90·83 of the base and 9·17 of sulphuric acid. It is soluble in water, but like sulphate of quina, requires the addition of a few drops of dilute sulphuric acid for its complete solution. Bebeerina is an alkaloid and combines with acids to form salts; the sulphate only has been as yet used in medicine. Its constitution is $C^{35} H^{20} O^6 N$, (Maclagan and Tilly), being identical with that of morphia.

THERAPEUTICAL EFFECTS.—The introduction of this new medicine into the *Materia Medica* is altogether due to the researches of my friend Dr. Douglas Maclagan of Edinburgh. It is unquestionably a *tonic* of much power, and as an *antiperiodic* its effects are but little if at all inferior to those of sulphate of quina. From a report of numerous cases in which it has been employed, and which have been published by Dr. Maclagan in the 63rd vol. of the *Edinburgh Medical and Surgical Journal*, it appears to differ from that remedy "in not being so liable to excite the circulation or affect the nervous system;" and this conclusion is fully borne out by my own experience of its effects in some cases in which I employed it.

DOSE AND MODE OF ADMINISTRATION.—Gr. j. to gr. v. three or four times a day, made into pill with conserve of roses, or dissolved in water by means of a few drops of dilute sulphuric acid; ℞j. may be given as a febrifuge.

INCOMPATIBLES.—The alkalies, and their carbonates; lime water; tartaric acid; the soluble tartrates; and all vegetable tinctures, infusions and decoctions containing tannin.

BISMUTHI SUBNITRAS, D. BISMUTHI TRISNITRAS, L. BISMUTHUM ALBUM, E. *Subnitrate (Trisnitrate) of Bismuth; White Bismuth; Magistery of Bismuth.*

PREPARATION.—*Dublin*.—"Take of bismuth, in small fragments, two ounces; pure nitric acid, three fluid ounces; distilled water, one gallon. Into the acid, first diluted with three ounces of the water, introduce the bismuth in successive portions, and, having, when the spontaneous action has ceased, applied for ten minutes a heat approaching that of ebullition, decant the solution off any particles of metal which may remain undissolved. Evaporate the solution at a gentle heat until it is reduced to two fluid ounces, and then pour it into half a gallon of the water. When the precipitate which forms has subsided, decant the supernatant liquid, and agitate the sediment with the remainder of the water. After twelve hours, again decant, and having placed the precipitate on a filter, dry it at a temperature of 212° , and reduce it to powder. *London*.—"Bismuth, ℥j.; nitric acid, f℥iss.; distilled water, Oij. mix f℥j. of the water with the nitric acid, and dissolve the bismuth in them, then pour off the solution, to this

add the remainder of the water, and set by that the powder may subside. Afterwards the supernatant liquor being poured off, wash the trisnitrate of bismuth with distilled water and dry it with a gentle heat." *Edinburgh*—"Bismuth in fine powder, $\mathfrak{z}\text{ij}$.; nitric acid, (Dens. 1380), $\mathfrak{f}\mathfrak{z}\text{iss}$. , water, Oij .; add the metal gradually to the acid, favouring the action with a gentle heat, and adding a very little distilled water as soon as crystals or a white powder begin to form. When the solution is complete, pour the liquid into the water, collect the precipitate immediately on a calico filter, wash it quickly with cold water, and dry it in a dark place."

PHYSICAL PROPERTIES.—This salt is met with in the form of a heavy white powder with a pearly lustre, which appears under the microscope to be composed of crystalline grains. It is inodorous and tasteless. It becomes of a grayish colour when exposed to the light.

CHEMICAL PROPERTIES.—The composition of this substance has been variously stated; it is most generally believed to consist of 3 equivalents of oxide of bismuth, and 1 of nitric acid, ($3 \text{ Bi O}^3 + \text{NO}^5$); but according to some recent researches of Buchner it appears to be $\text{Bi O}, \text{NO}^5 + 2 \text{ Bi O}, \text{HO}$. It is very insoluble in water, but is readily dissolved by nitric acid.

Adulterations.—As generally met with, this salt is free from impurities. It is said sometimes to contain carbonates, which may be detected by the effervescence produced when the powder is dissolved in nitric acid.

THERAPEUTICAL EFFECTS.—In large doses, nitrate of bismuth is said to act as an irritant poison, causing inflammation of the stomach and intestines; and a case is on record in which $\mathfrak{z}\text{ij}$. caused symptoms of poisoning; but more recently M. Monneret has given it in very large doses from $\mathfrak{z}\text{ij}$. to $\mathfrak{z}\text{vj}$. daily without the production of any ill effects. Accounts vary much as to its medicinal action, according to some practitioners in small doses from five to six grains three times daily it acts with much certainty in painful derangements of the stomach; others state that to prove beneficial it must be given in at least scruple doses; while Monneret always commences its administration in such doses that two drachms are taken in the course of the day, and the quantity is rapidly augmented until six or eight drachms constitute the daily dose. The beneficial results derived from its use in these affections have been generally ascribed to its tonic properties; more recently, however, they are said to be owing to a peculiar sedative action which it exerts on the nerves of the stomach. The forms of dyspepsia in which alone it proves serviceable, are those chronic affections attended with much pain, but unaccompanied by organic disease. It has also been employed in chlorotic dyspepsia and in diarrhœa, especially the colliquative diarrhœa of phthisis. My own experience of its use is not at all favorable, and surely there must be some uncertainty in a medicine the dose of which is said to vary so much. I do not think that in the present day it is as much used as it formerly was.

DOSE AND MODE OF ADMINISTRATION.—It may be made into an electuary or bolus, with some aromatic powder and syrup, or

honey; Monneret recommends the dose to be taken during meals, and he usually gives it in broth or milk.

INCOMPATIBLES.—Potash, soda, ammonia, and their carbonates.

CALCII CHLORIDUM, D. L. CALCIS MURIAS, E. *Chloride of Calcium. Muriate of Lime. Hydrochlorate of Lime.*

PREPARATION.—*Dublin*.—"Take of chalk, in small fragments, two pounds; pure muriatic acid, two pints and a half; distilled water, six pints; slacked lime as much as is sufficient: into the acid, first diluted with water, introduce the chalk in successive portions, and when the effervescence has ceased, boil for ten minutes. Add now, stirring well, a very slight excess of slacked lime, and throw the whole upon a calico filter. Acidulate the filtered solution slightly by adding a few drops of muriatic acid, then evaporate it to dryness, and expose the residuum to a low red heat in a Hessian crucible. Finally, reduce the product rapidly to a coarse powder in a warm mortar, and enclose it in a well stopped bottle." *London*.—"Chalk, ℥v.; hydrochloric acid, and distilled water, of each, Oss.; mix the acid with the water, and to these gradually add the chalk to saturation. Then the effervescence being finished, strain; evaporate the liquor until the salt is dried. Put this into a crucible, and having liquefied it in the fire, pour it upon a clean flat stone. Lastly, when it is cold break it into small pieces, and keep it in a well closed vessel." *Edinburgh*.—"White marble, in fragments, ℥x.; muriatic acid, of commerce; and water, of each, Oj.; mix the acid and water; add the marble, by degrees, and when the effervescence is over, add a little marble in fine powder till the liquid no longer reddens litmus; filter and concentrate to one-half; put the remaining fluid in a cold place to crystallize; preserve the crystals in a well closed bottle; more crystals will be obtained on concentrating the mother liquor."

PHYSICAL PROPERTIES.—This salt is usually met with in colourless translucent masses, but it crystallizes from a concentrated solution in long striated rhombic prisms. It is inodorous, and has an acrid, bitter, saline taste.

CHEMICAL PROPERTIES.—Crystallized chloride of calcium is composed of one equivalent of calcium, one of chlorine, and six of water of crystallization, $\text{Ca Cl} + 6 \text{HO}$. Exposed to the air it deliquesces rapidly; it is very soluble in water and in alcohol. By heat, the water of crystallization is driven off, and at a red heat it fuses.

Adulterations.—This salt should be perfectly colourless, the presence of iron with which it is occasionally contaminated giving it a yellowish tinge. The adulteration with magnesia may be detected by ammonia giving a white precipitate with a solution of the salt. In the following test the Edinburgh College has guarded against any alkaline impurity.—"A solution of 76 grains in f℥j. of distilled water, precipitated by 49 grains of oxalate of ammonia, remains precipitable by more of the test."

THERAPEUTICAL EFFECTS.—Chloride of calcium acts as an irritant poison in large doses. In medicine, it was at one time much employed in the treatment of bronchocoele and in scrofulous diseases, being given internally, and at the same time used externally, dissolved in water, in the form of bath; its action was said by some to

be tonic and deobstruent, by others cathartic. In the present day, however, it has nearly fallen into disuse. It forms a principal ingredient in many mineral waters.

DOSE AND MODE OF ADMINISTRATION.—It is always administered in solution; the following is a convenient formula.—*Liquor calcii chloridi*, D. L. *Calcis muriatis solutio*, E.—(Chloride of calcium (crystallized, E.), ℥iij. (℥iv. L. ℥viiij. E.); distilled water, f℥xij.; dissolve the salt in the water, (and filter through paper, D., strain, L.), “Specific gravity, 1225,” D.). Dose, min. xxx. to f℥ij. diluted with water.

INCOMPATIBLES.—Sulphuric acid, and the soluble sulphates; potash and soda, and their carbonates; and carbonate of ammonia.

CALUMBA, D. L. E. *Calumba*; root of *Cocculus palmatus*. A native of the forests of Mozambique and Oïbo in Africa; belonging to the Natural family *Menispermaceæ*, and to the Linnæan class and order *Diœcia Hexandria*.

BOTANICAL CHARACTERS.—An annual climber; Root, perennial, tuberose; Stem, herbaceous; Leaves, alternate, cordate at the base, 5-7 lobed, somewhat hairy; Flowers, diœcious, small, green, in axillary racemes; Fruit, a drupe or berry, one-celled, one-seeded.

PREPARATION.—The roots are dug up in March, cut horizontally into slices and dried in the shade; the offsets or tubers from the main root only are used.

PHYSICAL PROPERTIES.—As met with in commerce, calumba root is in circular flat pieces, from 3 to 10 lines thick, and from half an inch to three inches in diameter. The pieces consist of a brownish-yellow rugous epidermis, a thick yellowish inner-bark, and a light, spongy, woody centre, of a grayish-yellow colour. The flat surfaces are depressed in the centre, and marked with concentric yellowish lines. It has a feeble, somewhat aromatic odour, and a strong purely bitter taste.

CHEMICAL PROPERTIES.—Calumba contains a crystalline, very bitter neutral principle, which has been named *Calumbin* and on which its medicinal properties depend, about a third of its weight of starch, a trace of volatile oil, gum, wax, &c. Its bitter principle is dissolved by cold and boiling water, by alcohol, and by ether. As boiling water dissolves out some starch also, a warm infusion becomes cloudy as it cools; the Dublin and Edinburgh Colleges, therefore, employ cold water for preparing the officinal infusion, a great improvement, inasmuch as the active principle is as completely extracted and the preparation is quite transparent.

Adulterations.—The root of a species of Bryony (*Bryonia epigæa*), and the root of *Frasera walteri* (American or false calumba), have been at times sold for the true calumba root. The former may be at once detected by its disagreeable, bitter, somewhat acrid taste, the latter by its infusion becoming dark-green on the addition of a sesqui-salt of iron, an infusion of the true root remaining un-

changed by the same test. Another false calumba is met with in the French drug market, which is known by its containing no starch, a cooled decoction not being affected by tincture of iodine.

THERAPEUTICAL EFFECTS.—Calumba is an excellent bitter tonic, being slightly aromatic, but free of all astringency. It is most usefully employed in the various forms of dyspepsia, depending on want of tone in the digestive organs, and in irritability of the stomach accompanied by vomiting, when there is no tendency to inflammation present; for this latter affection it is peculiarly adapted in consequence of its property of arresting vomiting, whether it be the consequence of disease or of the administration of emetics. It is also used with much benefit to allay the sympathetic vomiting of pregnancy, and that which depends on diseases of the other abdominal viscera. The *anti-emetic* property of calumba probably depends on its active principle *calumbin*, which, in addition to its action as a bitter, possesses also narcotic properties. In the advanced stages of diarrhoea and dysentery, when the use of tonics is indicated, calumba is an excellent remedy.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to 3ss.—*Infusum Calumbæ*, D. L. E. ("Take of calumba root, in coarse powder, three drachms; cold water, nine ounces. Macerate for two hours, and strain. The product should measure about eight ounces," D.—"Calumba, sliced, 3v.; boiling distilled water, Oj.; macerate for two hours in a lightly covered vessel and strain," L.—"Calumba, in coarse powder, 3ss.; cold water, about a pint; triturate the calumba with a little water so as to moisten it thoroughly, put it into a percolator, and transmit cold water till f3xvj. of infusion be obtained," E.). For the reasons before stated, the Dublin and Edinburgh preparations are to be preferred. Infusion of calumba is usually employed as a vehicle for the more active tonics, and is given in doses of from f3j. to f3ij. The salts of iron, the alkalies, and their carbonates do not alter the colour of this infusion, and consequently may be advantageously combined with it in prescription.—*Tinctura Calumbæ*, D. L. E. ("Calumba root, in coarse powder (sliced, L.), 3v. (3ij., L.); proof spirit, Oij.; macerate for 14 days (strain, express, D.), and filter," D. L.—"Calumba in small fragments, (if by percolation in moderately fine powder), 3ij.; proof spirit, Oij.; digest for 7 days; pour off the clear liquor, express the residuum strongly and filter the liquors. This tincture is much more conveniently prepared by the process of percolation, allowing the powder to be soaked with a little of the spirit for six hours before putting it into the percolator," E.). Dose, f3j. to f3ij.—*Extractum Calumbæ*, B. (Calumba, sliced, 1 part; rectified spirit, 6 parts; digest for 2 hours at a temperature of from 86° to 104° F., and then express; pour upon the residue 2 parts of rectified spirit, digest and express as before; mix the two liquors, distil off the spirit, and evaporate to a due consistence). An excellent tonic extract; Dose, gr. v. to gr. xx.

INCOMPATIBLES.—Tincture of iodine; nitrate of silver; and the acetates of lead.

CANELLA, L. E. CANELLA ALBA, CORTEX, D. *Canella bark*; *Bark of Canella alba*. This, the *White Wood* or *Wild Cinnamon tree* of the West Indian islands and of South America, belongs to the Natural family *Meliaceæ* (*Canellaceæ*, Lindley), and to the Linnæan class and order *Dodecandria Monogynia*.

BOTANICAL CHARACTERS.—A handsome tree, 40-50 feet high; Leaves, alternate, obovate, shining, coriaceous; Flowers, small, glaucous blue, in clusters at the extremities of the branches; Fruit, a small, bluish-black berry, generally one-celled.

PHYSICAL PROPERTIES.—Canella bark is met with in pieces of from 3-12 inches long, generally quilled, and from one to three lines thick. They are of a yellowish or pinkish-white colour, have a faint aromatic odour, and an acrid very spicy taste. This bark is often called *false Winter's bark*, as it is frequently sold for the bark of *Drymis winteri*, which was formerly officinal in the Dublin Pharmacopœia.

CHEMICAL PROPERTIES.—The medicinal activity of canella bark is due to volatile oil and bitter extractive; it also contains a peculiar crystalline principle resembling *mannite* in its properties, and which has been named *Canellin*.

THERAPEUTICAL EFFECTS.—Canella is an aromatic tonic of some power; it is seldom employed alone in this country, but is used as an adjunct to the bitter tonics in dyspepsia. It is also combined with cathartics in debilitated states of the digestive organs, and to correct their griping qualities; Dose in powder, gr. x. to ʒss. It enters into the composition of the *Vinum Aloes*, L., and of the *Tinctura* and *Vinum Gentianæ*, E.

CASCARILLA, D. L. E. *Cascarilla bark*. *Bark of Croton eleuteria*, D.—of *Croton cascarilla*, L.—probably of *Croton eleuteria*, and possibly of other species of the same genus, E. *Croton eleuteria*, to which this bark is correctly referred by the Dublin College, is a native of the Bahamas, being found chiefly on the island of Eleuthera, whence its specific name; it belongs to the Natural family *Euphorbiaceæ*, and to the Linnæan class and order *Monœcia Monadelphia*.

BOTANICAL CHARACTERS.—A moderate sized tree; Branches, angular, somewhat compressed; Leaves, alternate, ovate, smooth, silvery beneath; Flowers, whitish monœcious, in compound axillary racemes.

PHYSICAL PROPERTIES.—Cascarilla bark occurs in short broken quills or flattened pieces, generally somewhat twisted. It is of a

reddish-brown colour, with a whitish or reddish-yellow fissured epidermis; hard, breaking with a close compact fracture; and has an aromatic, bitter taste, and a peculiar agreeable odour, which becomes very fragrant when the bark is burned.

CHEMICAL PROPERTIES.—According to the analysis of Duval, this bark contains a bitter, crystalline, neutral principle which has been named *Cascarillin*, a peculiar form of tannin, albumen, a red colouring matter, fatty matter, wax, gum, odorous volatile oil, resin, starch, pectic acid, salts of lime and potash, and woody fibre. It yields its active properties to both water and alcohol; the colour of the infusion is deepened by the sesqui-salts of iron.

Adulterations.—Copalchi bark, obtained from the *Croton pseudo-china*, a native of Mexico, has been occasionally substituted in commerce for cascarilla bark, which it resembles much both in odour and properties. The quills are much larger than those of cascarilla bark, more completely covered with minute white lichens, and have no transverse cracks.

THERAPEUTICAL EFFECTS.—Cascarilla is an aromatic tonic, possessing but little astringency. It is principally used as an agreeable addition to other remedies of this class in atonic dyspepsia, in the advanced stages of diarrhœa and dysentery, and in convalescence from fevers or other acute diseases. It has also been employed in intermittents as a substitute for cinchona bark, and it is stated with great success.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to ʒij. — *Infusum Cascarillæ*, D. L. E. (Cascarilla bark, in coarse powder (bruised, L. E.), ʒj. (ʒiss., L. E.); boiling (distilled, L.) water, Oss. (Oj., L. E.); infuse (macerate, L.) for 1 hour (2 hours, L. E.) in a covered vessel, and strain “through linen or calico,” E., “the product should measure about fʒviij.,” D.). Dose, fʒj. to fʒij. An agreeable vehicle for more active medicines.—*Mistura Cascarillæ composita*, L. (Infusion of cascarilla, fʒxviij.; vinegar of squill, fʒj.; compound tincture of camphor, fʒij.; mix). “A combination which is of use in chronic affections of the mucous membrane of the lungs,” PHILLIPS. Dose, fʒj. to fʒiss. two or three times a day.—*Tinctura Cascarillæ*, D. L. E. (Cascarilla bark, in coarse (moderately fine, E.) powder (bruised, L.), ʒv.; proof spirit, Oij.; macerate for 14, (7, E.) days, (strain, express, D.) and filter. “Proceed by percolation or digestion as directed for tincture of cinchona,” E.). Dose, fʒj. to fʒss.

INCOMPATIBLES.—Lime water; sulphate of iron; sulphate of zinc; tartar emetic; nitrate of silver; and acetate of lead.

CENTAURIUM, L. E. *Common Centaury*. *The herb*, L. — *the flowering heads*, E., of *Erythrœa centaurium*. Indigenous; belonging to the Natural family *Gentianaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Annual, 8-10 inches high; Stem, nearly simple; Leaves, ovato-oblong, in distant pairs; Flowers, handsome, rose-coloured, in corymbose panicles near the top of the stem.

The whole of this plant is odourless, but has a strong purely-bitter taste. It should be collected when in flower, and dried with a stove heat; all parts of the plant except the flowers contain bitter extractive, the Edinburgh College is therefore incorrect in directing the flowering heads to be used. It imparts its properties, which depend on the bitter extractive, to boiling water. The common centaury is scarcely ever used in the present day, except as a domestic remedy; nevertheless, it forms an excellent indigenous substitute for gentian. It is best given in the form of infusion, (prepared with ℥ss. of the dried herb, and ℥℥xij. of boiling water), in doses of ℥℥j. or ℥℥ij.

CETRARIA, L. E. CETRARIA ISLANDICA, D. Liverwort. Iceland-moss. *Cetraria islandica* is a native of the northern parts of the British Isles, and of the colder regions of both the New and Old Worlds. It belongs to the Natural family *Lichenaceæ* (*Lichinales*, Lindley), and to the Linnæan class and order *Cryptogamia Algæ*.

BOTANICAL CHARACTERS.—*Thallus* foliaceous, erect, tufted, laciniated, channelled, dentato-ciliate; *Apothecia*, brown, appressed, flat, with an elevated border.

PHYSICAL PROPERTIES.—As met with in the shops, Iceland moss is greyish or brownish-white, silvery; it has a faint peculiar odour, and a mucilaginous, somewhat bitter taste.

CHEMICAL PROPERTIES.—It consists of the starchy matters (*lichenin* and *inulin*), a bitter principle (*cetraric acid*), two acids (*lichestearic* and *lichenic acids*), with uncrystallizable sugar, gum, extractive, colouring matter (*Chlorothalle*), some salts, and amylaceous fibre. By maceration in cold water, the bitter principle is extracted, and the water acquires a brownish colour. By boiling in water about 65 per cent. is dissolved, and when sufficiently concentrated, the liquid cools into a firm jelly.

THERAPEUTICAL EFFECTS.—Iceland moss is a mild bitter tonic, and as it is also nutritive, it forms an excellent article of diet in diseases of debility, and in convalescence from acute diseases. It is used also as an article of food, the bitter principle having been previously removed by maceration in cold water or in a weak alkaline ley, (water 300 parts, and carbonate of potash 1 part); but when its tonic powers are required, the bitter principle should not be removed, as is frequently done.—*Cetraric acid* is the tonic principle of Iceland moss, it has been obtained in a separate state by the process described below, and has been used in Italy with much success as a substitute for sulphate of quina.

DOSE AND MODE OF ADMINISTRATION.—*Decoctum Lichenis Islandici*, D. *Decoctum Cetrariæ*, L. (Iceland moss, ℥j. (5v., L.);

boiling water, Oiss. ; "wash the moss in cold water to remove impurities, then boil it for ten minutes in a covered vessel, and strain while hot. The product should measure about a pint," D. "Boil down to Oj. and strain," L.) Dose, fʒj. to fʒiv.—*Cetraric acid*, (Iceland moss, coarsely powdered, any quantity; digest in rectified spirit as long as it acquires a bitter taste; distil off the greater part of the spirit and filter while hot. The impure cetraric acid which is deposited as the liquor cools, may be purified by redissolving in boiling alcohol and crystallizing). Dose as a febrifuge, gr. ij. to gr. v. every three hours. Sixteen grains thus given in divided doses, are said to be sufficient to check the return of the fit in ague.

INCOMPATIBLES.—Potash; the salts of lead and of copper; the sesquisalts of iron; and iodine.

CHIRETTA, D. E. *Chiretta* or *Chirayta*. The herb (and root, E.) of *Agathotes chirayta* (*Ophelia chirata*, Grisebach). A native of the northern parts of the continent of India; belonging to the Natural family *Gentianaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Annual; Stems, smooth, jointed, branched, erect, about 3 feet high; Leaves, opposite, amplexicaul, very acute; Flowers, yellow, very numerous, stalked, in terminal panicles.

PREPARATION.—The whole plant is pulled up at the time the flowers begin to decay, and dried in the sun for use. It is imported in bundles tied with strips of cane, and packed in large chests.

PHYSICAL PROPERTIES.—As met with in the shops, chiretta consists of the root, stems, and branches. The stems are round and smooth, about the thickness of a writing pen, with a shining brown epidermis, and a yellow spongy pith. The whole plant has a purely bitter, not unpleasant taste, without any astringency.

CHEMICAL PROPERTIES.—Chiretta is composed of resin, yellow bitter matter, brown colouring matter, gum, malic acid, salts of potash and lime, and traces of oxide of iron, (*Lassaigne* and *Boissel*). It yields its bitterness to water and to alcohol.

Adulterations.—Bundles of another plant, bearing some resemblance to chiretta, are sometimes found mixed with it in the chests in which it is brought to this country; they may, however, be readily detected, as they do not possess the least bitter taste.

THERAPEUTICAL EFFECTS.—Chiretta is a powerful, purely bitter tonic, bearing much resemblance to gentian. Under its use the bowels are relaxed and the secretion of bile promoted; it is therefore peculiarly adapted as a tonic for dyspepsia accompanied by constipation. It is much employed in the East, where its febrifugal properties are held in high estimation by the European practitioners, who use it instead of cinchona when the latter is not to be procured.

DOSE AND MODE OF ADMINISTRATION.—In powder, a bad form,

gr. x. to gr. xx.—*Infusum Chirette*, D. E. ("Take of chiretta, bruised, two drachms; boiling water, nine ounces and a half: infuse for one hour, in a covered vessel, and strain. The product should measure about eight ounces." D.—"Chiretta, 3iv.; boiling water, Oj.; infuse for two hours and strain through linen or calico." E.). This infusion would be better prepared by using double the quantity of chiretta, and employing cold water. Dose, f3j. to f3ij.—*Tinctura Chirette*, D. (Take of chiretta, bruised, five ounces; proof spirit, two pints: macerate for fourteen days, strain, express, and filter). Dose, f3j. to f3ij.

CHONDRUS CRISPUS. *Carragheen, or Irish moss*. This substance consists of this and many allied species, dried and bleached in the sun. For medical use it is principally gathered by the peasantry on the south-west coast of Ireland. As commonly met with it is of a yellowish-white colour, dry and very crisp; in most of its properties it resembles Iceland moss, but is more mucilaginous and less bitter. It forms a somewhat similar jelly with boiling water or milk, and is frequently used as a substitute for that substance. Dr. Frank, of Wolfenbuettel, recommends the following compound powder of Irish moss as a diet for phthisical patients, and for children affected with *tabes mesenterica*:—Take of carragheen moss, cleaned, 3ss.; spring water, f3xvj.; boil down to one-half, strain with expression, and add to the strained liquor, white sugar, 3iv.; gum arabic, powdered, 3j.; and powdered orris-root, 3ss.; heat to dryness with a gentle temperature, stirring constantly so as to obtain a pulverulent mass, to which 3iij. of arrowroot are to be added with trituration. A jelly is prepared with this powder, by rubbing a tea-spoonful of it with a little cold water, and then pouring a cupful of boiling water on it. It has a most agreeable odour and taste, and is highly nutritious.

CINCHONA FLAVA, D. E. CINCHONA CORDIFOLIA, L. *Yellow Cinchona Bark*. Bark of an unascertained species of *Cinchona*, D. E.—of *Cinchona cordifolia*, L. Bark of *Cinchona calisaya*, (Weddell).

CINCHONA RUBRA, D. E. CINCHONA OBLONGIFOLIA, L. *Red Cinchona Bark*. Bark of an unascertained species of *Cinchona*, D. E.—of *Cinchona oblongifolia* (Lambert), L.

CINCHONA CONDAMINEA, D. CINCHONA LANCIFOLIA, L. CINCHONA CORONÆ, E. *Pale Cinchona Bark*. Crown or Loxa Bark. Bark of *Cinchona condaminea*, D. E.—of *Cinchona lancifolia*, L.

CINCHONA MICRANTHA, D. CINCHONA CINEREA, E. *Gray or Huanaco Bark*. Silver Bark. Bark of *Cinchona micrantha*.

Much confusion still exists as to the Natural History of the Cinchona barks, and the more recent investigations have proved that the

botanical references of the London College are altogether erroneous. The exact species from which the yellow and red barks of the pharmacopœias are obtained have not been yet determined; but crown bark (pale bark, L.) is undoubtedly the produce of *Cinchona condaminea*, as also is silver bark of *Cinchona micrantha*. All the cinchona trees are inhabitants of the Andes, growing at different elevations from 1200 to 10,080 feet above the level of the sea, and in the region extending from 11° N. latitude to 20° S. latitude. They belong to the Natural family *Cinchonaceæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Trees or tall shrubs; Leaves, shortly petioled with plain margins; Stipules, ovate or oblong, foliaceous, free, deciduous; Flowers, white, or rose-coloured, in terminal corymbose panicles; stamens, included within the tube of the corolla; Capsule, ovoid, elongated, crowned with the teeth of the calyx, 2-celled, 2-valved, containing many winged seeds.

PREPARATION.—Bark-peeling, as it is termed in South America, is practised by the native Indians; the bark of the entire tree both stem and branches is removed, the trees being in general previously cut down; it is then dried with great care so as to preserve its bright colour, the larger and thicker pieces being dried so as to form flat pieces, the smaller being allowed to curl into quills. The epidermis with the lichens, which naturally grow on it, is carefully preserved on the bark, but if it be very coarse or injured it is frequently removed. Bark-peeling occupies the entire of the dry season from May to November.

PHYSICAL PROPERTIES.—It would be quite foreign to the scope of this work to enter into any detailed account of the numerous varieties of cinchona bark which are occasionally met with in commerce. I shall only describe those which most frequently occur, and which are most generally used for medical purposes; and in so doing I shall adopt the classification generally followed in the English drug trade: namely, *Yellow, Red, and Pale Cinchona barks*.

1st.—**YELLOW BARK, *Cinchona flava*.** The botanical origin of this bark, the *China regia* of Von Bergen, is ascribed by Weddell, who investigated the history of Cinchona barks in their native country, to the *Cinchona calisaya*. It is met with in two varieties, *quilled* and *flat*. The *quills* are generally from 9 to 18 inches long, from half an inch to two inches in diameter, and from one to six or seven lines in thickness. They are in general singly quilled, and coated with a very rough light-gray epidermis; externally they are marked with longitudinal wrinkles, and traversed with horizontal fissures often extending completely round the quills; and large patches of grayish-white lichens are usually adherent. Internally, they are smooth and of a cinnamon-brown colour. The *flat* pieces are from 8 to 18 inches long, from one to four inches broad, and from one to five lines thick; they are in general freed of their epidermis, but when present it is similar to that of the quilled bark. The colour is reddish-brown externally and cinnamon-brown within. Both sorts break with a fibrous, splintery fracture, and yield an orange-yellow powder. They have a faint aromatic odour, and an aromatic, bitter, somewhat astringent taste. An account of the cryptogamic plants

which are found on this and the other sorts of cinchona bark has been given by Fée and by Zenker, and an attempt made to distinguish the different barks according to the species which predominate on each, but it is much too refined and difficult for practical purposes; and moreover Weddell states that the presence of peculiar varieties of the cryptogamia on the barks depends on the district in which the trees grow and not on the species of Cinchona. Yellow bark is imported in serons and chests from Arica, a seaport of Bolivia.

2nd—RED BARK, *Cinchona rubra*. The species from which this bark, the *China rubra* of Von Bergen, is obtained is as yet unknown. It occurs in quills and in flat pieces. The *quills* are from 3 to 15 inches long, from two lines to an inch and a quarter in diameter, and from half a line to two lines thick. Externally they are of a reddish-brown colour (the smaller quills are grayish-brown); they are usually rough, wrinkled, and furrowed; and have a few scattered patches of grayish-white lichens. The *flat* pieces are from two inches to two feet in length, from one to five inches in breadth, and from a third of an inch to three quarters of an inch in thickness; they are seldom quite flat, being generally somewhat convex. The epidermis is seldom absent, it is of a reddish or chesnut-brown colour, rough, wrinkled, and usually warty. The inner surface of both sorts is fibrous, and of a reddish-yellow or reddish brown colour, the thickest pieces being the darkest coloured. The transverse fracture is fibrous and splintery, and the powder is pale reddish brown. Red bark has a feebly aromatic, somewhat earthy odour, and a bitter, strongly astringent taste. It is imported in chests, never in serons; good red bark is now scarce in the English market, when met with genuine it is much esteemed and bears a high price.

3rd—PALE BARK, *Cinchona coronæ*, E. This bark (*Crown or Loxa bark*, D.), the *China loxa* of Von Bergen, is the produce of the *Cinchona condaminea* of Humboldt and Bonpland. It is always met with in the form of quills, never in flat pieces. These quills are single or double, from six to fifteen inches long, from two lines to an inch in diameter, and from one-fourth of a line to two lines thick. The epidermis is always present, it is furrowed with numerous transverse fissures or cracks, and frequently also with longitudinal splits. Externally, the bark is of a pale grayish-brown colour, and covered with a great number of small whitish and ash-coloured lichens. Internally it is smooth and of a pale cinnamon-brown colour; its fracture is fibrous, and it yields a paler coloured powder than either yellow or red bark. The odour and taste are nearly similar to those of red bark. The fourth variety of bark which is officinal in the Dublin and Edinburgh pharmacopœias is also a pale bark, and whenever met with, at least in the Dublin market, is sold under that name; it is rather scarce at present, but is a very good bark; it may be readily distinguished from other barks by the edges of the most perfect quills being cut obliquely; it is the produce of *Cinchona micrantha*. Both these varieties of

pale bark are imported in chests and in serons, and are often mixed together in the same package.

Several other varieties of cinchona bark, although not officinal, are frequently met with in commerce, and are many of them of good quality; a detailed account of them will be found in the works of Pereira, of Christison, and of Guibourt. The so-called *false cinchona barks* will be considered under the head of *adulterations*.

CHEMICAL PROPERTIES.—According to the analysis of various chemists, more especially those of Pelletier and Caventou, cinchona barks appear to consist of three peculiar alkaloids—*quina*, *cinchonina*, and *aricina* or *cuzconia*, in combination with a peculiar acid—*kinic* or *cinchonic acid*, together with a variety of tannin, two peculiar colouring matters—*cinchonic red* and *cinchonic yellow*, green fatty matter, kinate of lime, starch, gum, ligneous fibre, and a trace of volatile oil. The proportion of these ingredients, particularly the alkaloids, differs remarkably in the various kinds of bark, thus *quina* predominates in yellow bark, and *cinchonina* in pale bark, while they are contained in nearly equal proportions in red bark. The medicinal properties of bark depend principally on the alkaloids quina and cinchonina, of these the former is the more active; it is officinal in the London pharmacopœia, but no process is given for its preparation, nor is it employed in medicine. A salt of quina, however, the disulphate, is in very general use as a substitute for cinchona bark; it is officinal in the three British pharmacopœias and is prepared as follows:—

QUINÆ SULPHAS, Dublin.—“Take of yellow bark, in powder, one pound; water, one gallon and a half; oil of vitriol of commerce, half a fluid ounce; rectified spirit, three pints; slacked lime, one ounce; animal charcoal, half an ounce; dilute sulphuric acid, half a fluid ounce, or a sufficient quantity. Macerate the bark for twenty-four hours with half a gallon of the water, acidulated with two drachms of the oil of vitriol, then boil for half an hour, and decant. Boil the residue with a second half-gallon of the water, acidulated with one drachm of the oil of vitriol, and again decant, and let this process be a third time performed with the rest of the water, and the residual drachm of oil of vitriol. Let the decanted liquors be evaporated to the bulk of one quart, and filtered through calico when cold, and to the solution thus obtained add the lime, until the mixture becomes decidedly alkaline. The precipitate, collected on a calico filter, is to be washed with about a pint of cold water, and, when partially dried on porous bricks, to be enveloped in blotting-paper, and subjected to a powerful pressure. The pressed mass must now be introduced into a flask containing a pint of the spirit, which is to be raised to and maintained at the temperature of ebullition for twenty minutes, and then, after the subsidence of the insoluble matter, decanted. This process having been repeated successively with the second and third pints of spirit, and the undissolved residuum having been subjected to expression, let the decanted and expressed liquors be cleared by passing them through a paper filter, and then subjected to distillation, so as to recover the entire of the spirit. The brown viscid mass which remains is now to be mixed with sixteen ounces of water, and this being raised to the boiling point, the dilute sulphuric acid must be added, so as to produce a neutral or very slightly acid solution. Add now the animal charcoal, boil for five minutes, filter, and set to cool, in order that crystals may be formed, which are to be dried on blotting paper by mere exposure to the atmosphere. The liquor decanted from the crystals will, by further concentration and cooling, yield an additional product.”—**QUINÆ DISULPHAS, London.**—“Yellow bark, bruised, lbvj.; sulphuric acid, ℥ix.; purified animal charcoal, ℥ij.; hydrated oxide of lead; solution of ammonia; and distilled water, of each, q. s.; mix ℥iv. ℥ij. of the acid with cong. vj. of distilled water, and add the bark to them; boil for an hour and

strain. In the same manner again boil what remains in acid and water, mixed in the same proportions, for an hour and again strain. Lastly boil the cinchona in cong. viij. of distilled water for 3 hours, and strain. Wash what remains frequently with boiling distilled water. To the mixed liquors add oxide of lead while moist, nearly to saturation. Pour off the supernatant liquor, and wash what is thrown down with distilled water. Boil the liquors for a quarter of an hour, and strain; then gradually add solution of ammonia to precipitate the quina. Wash this until nothing alkaline is perceptible. Let what remains be saturated with the rest of the sulphuric acid, diluted. Afterwards digest with ℥ij. of animal charcoal, and strain. Lastly, the charcoal being thoroughly washed, evaporate the liquor cautiously that crystals may be produced."—*QUINÆ SULPHAS, Edinburgh*.—"Yellow bark, in coarse powder, ℔bj.; carbonate of soda, ℥viij.; sulphuric acid, f℥ss.; purified animal charcoal, ℥ij.; boil the bark for an hour in Oiv. of water, in which half the carbonate of soda has been dissolved; strain and express strongly through linen or calico; moisten the residuum with water and express again; and repeat this twice. Boil the residuum for half an hour with Oiv. of water and half the sulphuric acid; strain, express strongly, moisten with water, and express again. Boil the residuum with Oij. of water, and a fourth part of the acid; strain and squeeze as before. Boil again the residuum with the same quantity of water and acid, strain and squeeze as formerly. Concentrate the whole acid liquids to about a pint; let the product cool; filter it; and dissolve in it the remainder of the carbonate of soda. Collect the impure quina on a cloth, wash it slightly, and squeeze out the liquor with the hand. Break down the moist precipitate in Oj. of distilled water, add nearly f℥j. of sulphuric acid, heat it to 212° , and stir occasionally. Should any precipitate retain its grey colour, and the liquid be neutral, add sulphuric acid, drop by drop, stirring constantly till the gray colour disappears. Should the liquid redden litmus, neutralize it with a little carbonate of soda. Should crystals form on the surface, add boiling distilled water to dissolve them. Filter through paper, preserving the funnel hot, set the liquid aside to crystallize; collect and squeeze the crystals; dissolve them in Oj. of distilled water heated to 212° ; digest the solution for 15 minutes with the animal charcoal, filter, and crystallize as before. Dry the crystals with a heat not exceeding 140° . The mother liquors of each crystallization will yield a little more salt by concentration and cooling."

The quantity of *disulphate of quina* obtained from yellow-bark varies with the quality of the bark, the average may be stated to be from $1\frac{1}{2}$ to 3 per cent. It occurs in very fine, needle-like, silky crystals, of a perfectly white colour; they are flexible, inodorous, and have a very bitter taste. Exposed to air they effloresce slightly; by a moderate heat they are fused, and by a red heat are decomposed. Sulphate of quina requires for its solution 740 parts of cold, but only 30 of boiling water; it is soluble in 80 parts of cold alcohol (specific gravity .850), and in much less of boiling alcohol; it is very soluble in diluted sulphuric acid. It is composed of 2 equivalents of quina ($C^{20}H^{12}O^2N$), 1 of sulphuric acid, and 8 of water.

In the preparation of sulphate of quina, the mother liquor that is left has a strongly bitter taste, and on the addition of an alkaline carbonate deposits a yellowish white or brownish precipitate, which on being washed with water and gently heated agglutinates into a resinous looking mass. This resinous substance was named by Sertuerner, who first discovered it, *Quinoidine*, and was found by him as well as by others who employed it in medicine, to possess properties but little inferior to sulphate of quina. Liebig has more recently investigated this matter, and has found that the so-called *quinoidine*, is uncrystallizable or *amorphous* quina, combined with

various inert substances. From these, the *amorphous quina* has been separated; it is identical in chemical composition with, and has the same atomic weight as quina, from which it appears to differ only in form—that is to say, it cannot be made to assume a crystalline shape. *Amorphous quina* is completely soluble in dilute sulphuric acid and in alcohol, and combines with the various acids to form salts.

Quina is most readily obtained by precipitating a solution of the disulphate with ammonia; when it occurs in the form of a snow-white amorphous powder, which may readily be obtained in the form of delicate silky needles, by dissolving it to saturation in boiling alcohol, and cooling the solution very slowly; it is void of odour, has an extremely bitter taste, and is strongly alkaline. It requires for its solution 200 parts of boiling water, but is very soluble in alcohol and in ether. *Cinchonia* may be obtained from pale bark, by a similar process to that for the preparation of quina from yellow bark. It crystallizes in colourless prisms, is inodorous, and has a feebly bitter taste. It requires 2500 parts of boiling water to dissolve it, is but slightly soluble in cold ether, and is much less soluble in alcohol than quina; in other respects it bears much resemblance to that alkaloid. Its composition is $C^{20}H^{12}N O$. The other substances of which cinchona bark is composed are unimportant in a medicinal point of view. The third alkaloid, which was named by its discoverers *aricina*, was found by Pelletier and Caventou in Arica or Cuzco-bark. Gum is found in the pale barks only.

The active constituents of cinchona bark are extracted by water, alcohol, proof spirit, and the dilute acids. Of these the acids much diluted, and proof spirit are the best solvents. Boiling water dissolves out the active principles more completely than cold water, but continued boiling, as in preparing decoctions and syrups, causes the red colouring matter to form a very insoluble compound with the alkaloids. The action of various re-agents on the infusion of cinchona bark, has been proposed as a means of ascertaining the medicinal value of the different varieties; but the results obtained by those who have published their experiments are so dissimilar, that it is unnecessary to give any account of them here.

Adulterations.—The principal frauds that are practised with reference to cinchona bark are, the substitution of the inferior true barks for the finer sorts; the admixture of bark which has been exhausted by successive macerations and then dried, with good bark; and the substitution of the so-called *spurious* or *false cinchona barks* for the true barks. Of the false barks, three in particular have been described, namely Piton bark, Caribbean bark, and Pitaya bark. They have all a disagreeable bitter taste, not aromatic: the latter only has been met with in British commerce; it occurs in quills, thin, compact, grayish-yellow externally, blackish-brown internally. A class of barks called on the continent *white cinchonas*, but always looked on in the British market as *spurious* or *false*

cinchonas, are often met with, mixed with the officinal barks. They are distinguished by the epidermis being whitish or pale yellowish, micaceous, smooth or not cracked, and adherent to the cortical layers. The other adulterations which have been mentioned above are very difficult to discover, as great experience is required to judge of the quality of bark (especially if in powder), by its physical properties. Of the quality of yellow bark, the best characteristic is,—the quantity of the alkaloid quina which it yields when treated by the processes of the pharmacopœias; but as they are difficult of application on the small scale, the Edinburgh College has given the following test, by which the greater part of the alkaloid contained may readily be procured in an impure state:—"A filtered decoction of 100 grs. in f3ij. of distilled water gives, with f3j. of concentrated solution of carbonate of soda, a precipitate, which when heated in the fluid becomes a fused mass, weighing when cold two grains or more, and easily soluble in solution of oxalic acid." Manufacturers of the disulphate of quina however generally employ the test proposed by Guibourt, by which the quantity of lime contained in the specimen is ascertained, for it has been found that those barks which are most rich in quina also contain most lime; the process is as follows:—"Mix the bark in fine powder with water, so as to form it into a fine paste, place this on paper, filter and add sulphate of soda to the filtered liquor as long as the white sulphate of lime is precipitated." According to Berzelius, the most efficacious barks are those which contain most tannin; and consequently, those which in infusion give the largest precipitate with solution of gelatin and with tartar emetic, should be preferred; and this test is applicable to all sorts of cinchona bark. Powdered cinchona bark is often adulterated with *red-saunders wood* in fine powder; the fraud may easily be detected by agitating the suspected specimen either with oil of turpentine or sulphuric ether: if it be thus adulterated, it will communicate a saffron colour to either of these liquids after a few minutes, but the pure bark has no effect on them.

Disulphate of quina is very liable to adulteration; the substances which are generally employed for this purpose are, sulphate of lime, gum, sugar or mannite, starch, fatty matters, and sulphate of cinchonia. By the application of the tests of the Edinburgh pharmacopœia, the freedom from any of these impurities, except that with the salt of cinchonia will be ascertained:—"A solution of gr. x. in f3j. of distilled water, and two or three drops of sulphuric acid, if decomposed by a solution of 3ss. of carbonate of soda in two waters, and heated till the precipitate shrinks and fuses, yields on cooling a solid mass, which when dry weighs 7·4 grains and in powder dissolves entirely in solution of oxalic acid." The presence of a salt of cinchonia, from which, in the present day but few specimens are free, may be detected by precipitating with ammonia a solution of the salt in water, collecting the precipitate and boiling in rectified spirit; if any cinchonia be present, it will be deposited

in crystals as the liquor cools. *Salicin* and *caffëin* are stated to be frequently employed on the continent of late years for the adulteration of disulphate of quina, the latter is too dear in this country to be used for that purpose; the presence of the former may be discovered by the addition of a few drops of sulphuric acid, if any salicin be present it will be changed to a bright red colour, but no effect is produced on pure disulphate of quina.

The preparation of *amorphous quina* has been made the subject of a patent in England, nevertheless, from observations which have been made on it, what hitherto has been offered for sale does not appear to be quite pure. Liebig gives the following simple test for ascertaining its purity:—Completely soluble in dilute sulphuric acid and in alcohol; the solution in a dilute acid yields upon precipitation by means of ammonia, exactly the same amount of precipitate as the weight of the substance originally dissolved in the acid.

THERAPEUTICAL EFFECTS.—The topical action of cinchona bark is astringent, anti-septic, and somewhat irritant; its general effects on the system, especially when given where debility exists, are eminently tonic; and when administered in certain states of disease, it is anti-periodic, that is to say, it possesses the power of checking diseases which recur at regular intervals, as ague, remittent fever, and periodic neuralgia. The cinchona alkaloids, without its astringency, possess in a concentrated degree the other properties of bark, and consequently since their discovery have been substituted to a great extent for the drug itself. Of the two alkaloids, it has been a very general received opinion that quina is much more active than cinchonina, and consequently the use of the latter has been very restricted; recent experience, however, particularly on the continent, goes far to establish the almost equal activity of cinchonina; indeed, according to some, while equally energetic as a tonic and anti-periodic, it is less irritant. Most practitioners, however, are of opinion that neither of the alkaloids possesses the same medicinal properties as cinchona bark, more especially in the treatment of intermittent diseases; but if reliance can be placed on the statements of those who have employed it, the *amorphous quina* of Liebig above described is identical in action with the bark itself.

As a topical agent bark has been used in the form of powder or decoction as an application to foul ulcers with excessive discharge, and to mortified parts; but for this purpose it is inferior to many of the vegetable substances contained in the division *Astringents* (See Chapter 4). As an internal remedy, bark is the most highly esteemed and most generally employed tonic in the whole *Materia Medica*. Its employment is indicated in all cases of debility, unaccompanied by any tendency to inflammation or to active hemorrhage, and provided also the stomach and digestive organs be not in an irritable condition. It is found peculiarly serviceable in those forms of debility with great laxity of the solids, which depend on, or are attended with, profuse discharges from the secreting organs. In the debility

attendant on convalescence from acute diseases, cinchona and its alkaloids are also found most efficacious tonics, but they should at first be administered with great caution, as any over-excitement is apt to cause a recurrence of the febrile or inflammatory symptoms. The principal use, however, of bark (or of the preparations of quina) is as an antiperiodic. In all diseases assuming an intermittent or remittent type, it is found to be the most efficacious remedy which has as yet been discovered; but its *modus operandi* in the cure of these maladies is so obscure, that it is in general said to be *specific*. Bark and the preparations of quina are best administered during the stage of intermission or remission, and given in as full doses as the stomach can bear, for it is essential to their beneficial influence that vomiting or purging be not produced. If there be irritability of the stomach or inflammatory tendency present, they should be previously removed by appropriate treatment; and indeed in most cases of intermittent fever, the administration of an emetic and purgative, previously to the employment of cinchona or its alkaloids, will be found serviceable. In neuralgic affections, in rheumatism, head-ache, amaurosis, stricture, &c., recurring at regular intervals, bark is found equally efficacious as in intermittent fever. It is also employed with much benefit in some inflammatory affections, when they assume an asthenic type, or when they occur in the old and debilitated, as in erysipelas, rheumatism, scrofulous ophthalmia, &c. Disulphate of quina, given in large doses frequently repeated, has in many instances been found productive of much benefit in the treatment of tetanus; and it is now much used in France, in doses of from one to three scruples, repeated three or four times a day, as a remedy for acute rheumatism. In all the diseases above enumerated, unless where an astringent effect is required, the cinchona alkaloids may be used, and they are preferred by many to the bark itself. The principal advantages which they possess are their much greater energy and the little tendency which they have to produce irritability of the stomach.

DOSE AND MODE OF ADMINISTRATION.—Cinchona bark is seldom given in the present day in the form of powder; the dose as a tonic, is from gr. x. to ℥ij. two or three times a day; as an antiperiodic, from ℥j. to ℥ij. every second or third hour, but few stomachs can bear such large doses. Its taste is best concealed by milk, with which, however, it should not be mixed until immediately before it is taken.—*Infusum Cinchonæ*, D. L. E. ("Take of Peruvian bark (crown or pale), in coarse powder, one ounce; boiling water, half a pint: infuse for one hour, in a covered vessel, and filter through paper. The product should measure about eight ounces," D.—"Pale bark bruised (any species of cinchona according to prescription in powder, E.), ℥j.; boiling (distilled, L.) water, Oj.; macerate (infuse, E.) for 6 (4, E.) hours in a covered vessel, and strain [through linen or calico, E.]," L. E.). This preparation is a mild stomachic and tonic, principally employed in dyspepsia and in the milder forms of debility. Dose, ℥℥j. to ℥℥ij. In the former

edition of the Dublin Pharmacopœia the infusion of bark was prepared with cold water, by maceration for 24 hours; it was a favourite remedy with most practitioners in cases where irritability of the digestive organs contraindicated the use of a more active preparation.—*Decoctum Cinchonæ*, D. L. E. (Cinchona bark, crown or pale (pale, yellow, or red, L., crown, gray, yellow, or red, E.), in coarse powder (bruised, L. E.), ʒss. (3x. L.); water (distilled, L.), Oss. (Oj. L., fʒxxiv., E.); boil for 10 minutes in a covered vessel, and strain while hot; “the product should measure about fʒviiij,” D. “Boil for 10 minutes, let the decoction cool, filter it, and evaporate to fʒxvj., E.”). Dose fʒj. to fʒij.—*Tinctura Cinchonæ*, D. L. E. (“Crown or pale (yellow, L.) cinchona bark, in coarse powder (bruised, L.), ʒviiij.; proof spirit, Oij.; macerate for 14 days (strain, express, D.) and filter,” D. L.—“Yellow bark, in fine powder, or any other species of cinchona according to prescription, ʒviiij.; proof spirit, Oij.; percolate the bark with the spirit, the bark being previously moistened with a very little spirit, left thus for 10 or 12 hours, and then firmly packed in the cylinder. This tincture may also be prepared, though much less expeditiously, and with much greater loss by the usual process of digestion, the bark being in that case reduced to coarse powder only,” E.) Dose, fʒj. to fʒij.—*Tinctura Cinchonæ composita*, D. L. E. (Crown or pale (yellow, E.) cinchona bark, in coarse powder (or fine, if percolation be followed, E., bruised, L.), ʒiv.; bitter-orange peel, dried (bruised, E.), ʒij. (ʒiiij., L. E.); Virginia snake root, bruised (in moderately fine powder, E.), ʒvj.; saffron, chopped fine, ʒij.; cochineal, powdered (bruised, E.), ʒj.; proof spirit, Oij.; “macerate for 14 days (strain, express, D.) and filter,” D. L. “Macerate for 7 days, strain, and express strongly, filter the liquors. It may be also conveniently prepared by percolation, as directed for compound tincture of cardamoms,” E.). This is a more agreeable but less powerful tonic than the simple tincture. It is commonly known as *Huxham's tincture of bark*; Dose, fʒj. to fʒss.—*Liquor Cinchonæ*, (prepared by exhausting any quantity of powdered yellow bark in a percolator first with proof spirit, and then with boiling water, mixing the liquors, and concentrating in vacuo or with a gentle heat). An excellent and active preparation; Dose, min. xx. to fʒss.—*Extractum Cinchonæ*, L. E. (“Yellow, pale or red cinchona bark, bruised, ʒxv.; distilled water, cong. iv.; boil down in cong. j. of water to Ovj. and strain the liquor while hot. In the same manner, boil down the bark in an equal measure of water, 4 times; lastly, all the liquors being mixed, evaporate to a proper consistence,” L.—“Take of any variety of cinchona, but especially the yellow or red cinchona, in fine powder, ʒiv.; proof spirit, fʒxxiv.; percolate the cinchona with the spirit; distil off the greater part of the spirit, and evaporate what remains in an open vessel over the vapour bath to a due consistence,” E.). The Edinburgh preparation, in which spirit is used as the solvent, is much the more active, but since the introduction of the preparations of quina into medicine, the extracts are seldom

used; Dose, gr. v. to gr. xx.—*Syrup of bark*, CADET. (Any variety of cinchona bark, according to prescription, bruised, 3ij.; pure sugar, lbj. 3iv.; distilled water, Oij.; boil for half an hour in a covered vessel; remove from the fire, set aside for a quarter of an hour and then strain with expression; as soon as the liquid is quite cold, filter; evaporate the filtered liquid with a gentle heat to the consistence of a syrup, and finally strain.). This is, I think, the best form for preparing the syrup of bark; I have had it tried practically with excellent results; the dose is from f3j. to f3ss.—*Jelly of bark and Iceland moss*, (Iceland moss; Carragheen moss, of each, 3j.; cinchona bark, in coarse powder, 3ss.; boil slowly for three quarters of an hour in a quart of water; express through fine muslin, and add, tincture of orange peel, f3ij.; and white sugar, 3ij.). I am indebted to Mr. Moore of this city for the formula for this preparation; the dose of it is one or two teaspoonfuls three times a day.

Quina and *Cinchonia* are but seldom employed in the uncombined state, in consequence of their insolubility; nevertheless they are preferred by some continental practitioners to any of their salts. The dose of either is from gr. iij. to gr. v. frequently repeated.—*Quina sulphas*, D. E. *Quina disulphas*, L. Dose, gr. j. to gr. v., three or four times a day. As an antiperiodic, it is administered in ague during the intermission, in divided doses, so regulated that from gr. xv. to ʒij., according to circumstances, may be taken in all. It may be administered in the form of pill, made with confection of roses or mucilage, or dissolved in some aqueous vehicle with the aid of dilute sulphuric acid; it should not be prescribed, as is frequently done in the infusion of roses, as most of it is precipitated in the form of an insoluble *tannate* of quina by the tannic acid contained in that preparation. Disulphate of quina may be administered in the form of enema, where there is very great irritability of the stomach; three times the ordinary dose or even more may be mixed with an ordinary starch enema, and administered about an hour before the paroxysm. Or it may be introduced into the system by the endermic method, the ordinary dose being sprinkled over the surface of the skin, denuded of the epidermis by means of a blister. In intermittent head-ache, gr. j. of the disulphate, mixed with gr. iij. of starch, has been snuffed up the nostrils occasionally.—*Pilula Quinae*, U. S. (Sulphate of quina, 3j.; gum acacia, in powder, 3ij.; syrup, q. s.; mix the sulphate of quina and the gum, and beat them with the syrup so as to form a mass to be divided into 480 pills); each pill contains gr. j. of the disulphate of quina.—*Vinum Quinae*, COLLIER. (Disulphate of quina, gr. xxiv.; citric acid, in crystals, gr. xv.; rub together, and dissolve in orange wine, f3xxiv.). An elegant formula; Dose, f3ss. to f3ij.—*Quina murias*, D. (Take of sulphate of quina, one ounce; chloride of barium, one hundred and twenty-three grains; distilled water, thirty-two ounces: dissolve the chloride of barium in two ounces of the water, and the sulphate of quina in the remainder, raised to the temperature of ebullition. Mix the two solutions, evaporate to one-half, filter, and continue the

evaporation by means of a steam or water heat, until crystalline spiculæ begin to appear. The solution is now to be permitted to cool, and the crystals which separate to be dried on blotting paper. The liquor decanted off the crystals will, by farther concentration and cooling, yield an additional product). The muriate of quina quina is preferred by many practitioners to the disulphate, but it is much more expensive; the dose is the same.—*Acetate, Citrate, Tartrate, Nitrate, Phosphate, and Tannate of Quina*, have also been used in medicine; they are all expensive preparations, and do not appear to me to be superior in any respect to the disulphate. They may readily be prepared by dissolving pure quina or *amorphous quina* to saturation, in the respective acids previously diluted with water, evaporating and crystallizing; their doses are the same as those of the disulphate.—*Amorphous quina* is administered in the same doses as the disulphate; it may be given dissolved in water by means of a few drops of any dilute acid.

The *Arseniate of Quina* has recently been employed in France with much success in the treatment of intermittent fevers. It is prepared by boiling for a short time in a glass flask, a mixture of ʒiiss. of pure quina, ʒj. of arsenic acid, and fʒiv. of distilled water, allowing the crystals to be deposited by cooling, separating them by filtration, and purifying by re-crystallization in distilled water. When well prepared, it is in the form of minute, feathery, white crystals; it is a bibasic salt. It is soluble in boiling water, from which the greater portion is deposited as the solution cools; it is slightly soluble in proof spirit, but very sparingly so in alcohol, and is insoluble in ether. The dose of it is from a tenth to a fourth of a grain dissolved in a large quantity of water. The *Valerianate of quina* has been described in the chapter on *Antispasmodics* (See, page 42).

The salts of cinchonia are prepared in a similar manner to those of quina; their doses are the same.

INCOMPATIBLES.—*With the preparations of Cinchona bark*.—Ammonia; lime water; carbonate of potash; arsenite of potash; tartar emetic; the sesqui-salts of iron; the acetates of lead; corrosive sublimate; nitrate of silver; tincture of galls; and gelatin. *With disulphate of quina*.—The alkalies, and their carbonates; lime water; tartaric acid; the soluble tartrates; and all vegetable tinctures, infusions, and decoctions containing tannin.

CONTRAJERVA, L. *Contrayerva*. Root of *Dorstenia Contrajerva*. A native of South America; belonging to the Natural family *Urticaceæ* (*Moraceæ*, Lindley), and to the Linnæan class and order *Monœcia Tetrandria*.

The *contrayerva* root of the shops is imported from Brazil, and is obtained from the *Dorstenia braziliensis*. It is of a reddish colour, tapering, from 2 to 3 inches long, about the thickness of the little

finger, and covered with slender root fibres. It has a weak aromatic odour, and a warm bitter taste. Contrayerva root is a mild aromatic tonic, at one time used in fevers of a low character, but at present it is very rarely employed. The dose of the powder is from ʒj. to ʒij.

CUPRI AMMONIO-SULPHAS, D. L. CUPRUM AMMONIATUM, E.
Ammonio-sulphate of Copper. Ammoniated Copper.

PREPARATION.—*Dublin*.—"Take of sulphate of copper, two ounces; commercial sesquicarbonate of ammonia, three ounces: rub them together in a porcelain mortar until effervescence has ceased, then roll up the residue in bibulous paper, and place it on a porous brick. When dry let it be enclosed in a bottle furnished with a well-fitted stopper." *London. Edinburgh*.—"Sulphate of Copper, ʒj.; carbonate (sesquicarbonate, L.) of ammonia, ʒiiss.; triturate them together till the effervescence has entirely ceased; wrap the mass in bibulous paper, and dry it in the air."

PHYSICAL PROPERTIES.—As usually met with, this preparation is of a fine azure-blue colour, with an ammoniacal odour, and a styptic metallic taste. It is in the form of powder, but may be crystallized in large right rhombic prisms.

CHEMICAL PROPERTIES.—The exact composition of the salt, as prepared for use in medicine, is doubtful. Exposed to the air, ammonia is given off, and a green powder left. It is soluble in water, and the solution has an alkaline reaction.

THERAPEUTICAL EFFECTS.—Ammoniacal sulphate of copper is employed in medicine as a tonic, and in consequence of its powers as such, as an antispasmodic also. It has principally been used in the treatment of epilepsy, chorea, and other spasmodic affections, and is frequently productive of great benefit when these diseases occur in debilitated constitutions about the period of puberty, and are unassociated with organic disease. It is not, however, as much employed at present as it formerly was.

DOSE AND MODE OF ADMINISTRATION. — Gr. ss. gradually increased to gr. v. twice or three times daily; it may be given in the form of pill made with bread crumb or confection of roses.—*Pilulæ Cupri Ammoniatæ*, E. (Ammoniated copper, in fine powder, 1 part; bread crumb, 6 parts; solution of carbonate of ammonia, a sufficiency; beat into a proper pill mass, and divide it into pills, each containing gr. ss. of ammoniated copper).—*Cupri Ammoniatæ Aqua*, E. *Liquor Cupri Ammonio-Sulphatis*, L. (Ammoniated copper, ʒj.; distilled water, Oj.; dissolve the salt in the water and filter). This solution is not employed in medicine, it was introduced into the pharmacopœias with the intention of being used as a test for arsenious acid, (see page 144).

INCOMPATIBLES.—Acids; potash; soda; and lime water.

In poisoning with this salt, the treatment is the same as in poisoning with sulphate of copper, (see page 59).

CUPRI SULPHAS. *Sulphate of Copper* (described in the division *Astringents*), has been employed as a tonic in chorea and epilepsy, but the ammoniacal sulphate is more generally preferred in these diseases. The dose and mode of administration have been described in the division *Astringents*, (see page 59).

CUSPARIA, L. E. *Cusparia* or *Angostura bark*. *Bark of Galipea officinalis*, E.—of *Galipea cusparia*, L. The bark is probably obtained from both species of *Galipea* mentioned above. They are natives of the warmer regions of South America, and belong to the Natural family *Rutaceæ*, and to the Linnæan class and order *Diandria Monogynia*.

BOTANICAL CHARACTERS.—*Galipea officinalis* attains a height of only from 12-15 feet; Leaves, trifoliate, from 8-12 inches long, having the odour of tobacco; Flowers, white, hairy, in stalked, axillary, terminal racemes.—*Galipea cusparia* is a lofty tree, 60-80 feet high; Leaves, trifoliate, about 2 feet long, agreeably fragrant; Flowers, white, with fascicles of hairs seated on glandular bodies on the outside, in stalked, almost terminal racemes.

PHYSICAL PROPERTIES.—*Cusparia* bark occurs in pieces from 3-10 inches in length, some nearly flat, others incompletely quilled, covered externally with a grayish-yellow, soft epidermis, removed from one edge apparently with a sharp knife; internally it is of a dark yellowish brown colour, somewhat fibrous. It breaks with a short resinous fracture; has a peculiar, rather unpleasant odour, and a warm, bitter, somewhat acrid taste.

CHEMICAL PROPERTIES.—According to the analysis of Fischer, this bark consists of 3·7 per cent. of a peculiar bitter principle (which has been named *Cusparin* by Saladin, who obtained it in a crystalline state by submitting an alcoholic tincture of the bark, prepared by percolation, to spontaneous evaporation), 1·7 of bitter hard resin, 1·9 of balsamic soft resin, 0·3 of volatile oil, gum, lignin, &c. The active properties of the bark are extracted by water and alcohol; it is probable that they depend on the neutral principle *Cusparin*, and on the bitter resin.

Adulterations.—About the commencement of this century, the substitution of a highly poisonous bark, which was brought from the East Indies, for true angostura bark, was very common in the British Isles and in various parts of the Continent; but since then, so far as I am aware, it had not been met with until some years since, when a specimen of the false bark was sent to me from a druggist's in this city, labelled *Angostura bark*. Upon inquiry, I found that a chest containing about two cwt. of the bark had lain in their store-house for upwards of forty years, but had never before been dispensed. False angostura bark may be readily distinguished from the true bark by its physical as well as chemical properties. It is generally in more perfectly quilled pieces, always much thicker and heavier; the epidermis is much mottled with greyish spots, or

covered with a rusty efflorescence; the taste is intensely bitter, very permanent, and it has no odour. The best chemical test is the application of nitric acid to a transverse fracture; it produces a bright red colour with the false bark, but merely deepens the colour of the true bark. The rusty efflorescence on false angostura bark is stained greenish-black by the same acid. This false bark was for a long time referred to the *Brucea antidysenterica*, a native of Africa; but the recent investigations of Christison, O'Shaughnessy and others have proved that it is the bark of *Strychnos nux-vomica*, (see p. 410).

THERAPEUTICAL EFFECTS.—Angostura bark is an excellent tonic, devoid of all astringency. It bears much resemblance to cinchona bark, than which it is generally held in much higher estimation as a febrifuge in South America,—being adapted for the worst and most malignant bilious fevers of the marshy districts, while the fevers in which cinchona bark is employed there, are simple intermittents, for the most part unattended with danger. It has never come into general use in Europe, in consequence of the serious accidents which resulted from the fraud above noticed, and it has been omitted from the last edition of the Dublin Pharmacopœia; nevertheless, it will be found very serviceable in atonic dyspepsia, in convalescence from acute diseases, and in the advanced stages of diarrhœa and dysentery.

DOSE AND MODE OF ADMINISTRATION.—In powder, gr. x. to 3ss. —*Infusum Cuspariæ*, L. E. (Angostura bark, bruised, 3v.; boiling water (distilled, L.), Oj.; macerate for two hours in a covered vessel and strain, “through linen or calico,” E.). Dose, f3j. to f3ij.—*Tinctura Cuspariæ*, E. (Angostura bark, in moderately fine powder, 3ivss.; proof spirit, Oij.; made like the tincture of cinchona and most expeditiously by the process of percolation). Dose, f3j. to f3ij.

INCOMPATIBLES.—The mineral acids; sesqui-salts of iron; nitrate of silver; and the acetates of lead.

FEL BOVINUM. *Ox-Gall.* *The fluid contents of the gall bladder of the ox, inspissated by heat.*

Ox-gall, although at one time much employed in medicine, fell completely into disuse until within the last few years, when it has again been brought under the notice of the profession, as an excellent tonic in various forms of dyspepsia. From my own experience of its effects in numerous cases in which I employed it, I can speak most highly of its remediate powers, particularly in that morbid irritability of the stomach accompanied by vomiting soon after the meals have been taken, and which does not depend on organic disease; it appears also to act as a gentle laxative. The following is the preparation which I have employed:—*Fel Bovinum inspissatum*, (Ox-gall, any quantity; dilute with an equal quantity of

distilled water, set aside for 12 hours until the impurities subside; pour off the clear liquor, boil and strain through linen or calico. Lastly, evaporate it in a water-bath to the consistence of an extract). Thus prepared it is odourless, but has an intensely bitter taste, leaving a somewhat sweetish impression upon the tongue and palate; the dose of it is from gr. v. to gr. x. two or three times a day.

FERRUM, D. L. FERRI FILUM ET LIMATURA, E. *Rod Iron; Iron wire; Turnings and Filings*, D. *Iron filings*, L. *Iron in the form of wire and in the form of filings*, E.

FERRI PULVIS, D. *Iron in fine powder; Metallic Iron reduced to a state of minute division by means of hydrogen*.

Iron is said to be met with in the metallic state in Russia and America, but it is very rare; it is usually found combined with other minerals in the state of oxide, sulphuret, carbonate, &c.

PREPARATION.—Metallic iron is an article of the *Materia Medica* in the three British pharmacopœias. It is most generally obtained from the native black oxide—*magnetic smelting* in blast furnaces.—PULVIS FERRI, D. Take of peroxide of iron; zinc, in *iron ore*, and from the native carbonate of the protoxide—*clay iron stone*, by small pieces; oil of vitrol; water, of each, a sufficient quantity: introduce into a gun-barrel as much of the peroxide of iron as will occupy the length of about ten inches, confining it to the middle portion of the barrel by plugs of asbestos. Let the gun-barrel be now placed in such a furnace as is used for organic analysis, one end of it being fitted by means of a cork into a bent adapter whose further extremity dips in water, while the other end (of the barrel) is connected with a bottle containing the zinc and water, with the intervention, however of a desiccation tube including fragments of caustic potash, and a small bottle half filled with oil of vitriol. Matters being thus arranged, a little oil of vitriol is to be poured into the bottle containing the water and zinc, with the view of developing a sufficiency of hydrogen to expel the air from the interior of the apparatus. As soon as this object is considered to have been accomplished, the part of the tube containing the peroxide of iron must be surrounded with ignited charcoal, and when it is thus brought to a low red heat, the oil of vitriol is to be gradually added to the zinc, so as to cause a steady current of hydrogen to pass through the oil of vitriol and desiccation tube into the gun barrel. As soon as the reduction of the oxide is completed, which may be judged to have taken place when the gas bubbles escape at apparently the same rate through the water in which the adapter terminates, and through the bottle containing the oil of vitriol, the fire is to be removed (a slow current of hydrogen being still continued), and when the gun-barrel has assumed the temperature of the air, its metallic contents should be extracted, and preserved in an accurately stopped bottle.

PROPERTIES.—Pure metallic iron is of a silver white colour, but as ordinarily met with, it is greyish-white, very brilliant, hard, and ductile; it is very malleable, particularly when heated. It has a peculiar taste, and emits an odour when rubbed. At an intense heat it fuses, but before it arrives at the point of fusion, it becomes soft, and in this state possesses the remarkable property of being capable of being *welded*. Iron is attracted by the magnet, and becomes itself magnetic by induction, but if pure, immediately loses its

polarity when withdrawn from the magnet. Its specific gravity is 7.8 and its atomic weight 28.

THERAPEUTICAL EFFECTS.—Iron, like other metals, does not exert any influence on the human system while it retains the metallic state; but as it is very readily oxidated and converted into salts, this change takes place in the stomach soon after it is swallowed, and then the effects of a tonic are produced. *Iron filings* were at one time much used in medicine, but in the present day they are scarcely ever employed in regular practice; the dose of them was from gr. x to 3ss. administered in the form of electuary or bolus made with treacle or honey.

More recently the employment of metallic iron, reduced to a state of minute division by means of hydrogen as in the above formula of the Dublin Pharmacopœia, (*fer réduit*, of the French), has been employed on the Continent, its use having been first introduced by M. M. Quevenne and Miquelard. The chief circumstance to be attended to during the operation of preparing it is the state of the temperature. If it be not sufficiently high, the reduction does not take place; and if it be too high, the iron is reduced, but is agglutinated into ductile plates. When well prepared it is in the form of a fine light powder, of a bright greyish slate colour, in very minute division, and free from any trace of sulphur. The advantages which this preparation is said to possess are, first, that it is readily acted on by the weak acids—the lactic and muriatic, which are ordinarily present in the gastric juice during digestion; and secondly, that it is free from the inky taste, which the preparations of iron possess in a degree proportioned to their solubility. The dose of it is gr. j. to gr. x.; it may be given in the form of pill or of bolus.

The general effects of the ferruginous preparations, when their use has been continued for some time, are tonic and astringent; but, when they have been given in too large doses, or their use persisted in for too long a period, they produce a state of over-excitement, characterised by a feeling of determination of blood to the head, of general fulness, and by other uneasy sensations. The morbid state of the system in which the preparations of iron are found most useful, is that which has been denominated *anemia*, in which the blood is deficient, in respect both of its quantity and of the relative proportion of red particles. The diseases, therefore, in which they have been employed, are chiefly those of debility accompanied by or dependant on *anemia*, as in chlorosis, amenorrhœa, menorrhagia, diseases of the urinary organs, scrofulous affections, passive hemorrhages, certain diseases of the digestive organs, neuralgia, &c. They have also been used with benefit in diseases of an intermittent or remittent type, in dropsical affections, in chronic enlargements of the liver or spleen, in cancer, in the advanced stages of Bright's disease of the kidney, in valvular diseases of the heart when a tonic is indicated, in chronic cutaneous affections, &c. The employment of the ferruginous preparations is contra-indicated where there is

any tendency to inflammation or active hemorrhage in the system, where there is irritability of the digestive organs, in persons of a full habit of body, and in those prone to a determination of blood to the head.

FERRI ACETATIS TINCTURA, D. *Tincture of the acetate of Iron.*

PREPARATION.—Take of sulphate of iron, eight ounces; distilled water, half a pint; pure sulphuric acid, six fluid drachms; pure nitric acid, half a fluid ounce; acetate of potash, eight ounces; rectified spirit, half a gallon. To nine ounces of the water add the sulphuric acid, and in the mixture, with the aid of heat, dissolve the sulphate of iron. Add next the nitric acid, first diluted with the remaining ounce of water, and evaporate the resulting solution to the consistence of a thick syrup. Dissolve this in one quart, and the acetate of potash in the remainder of the spirit, and, having mixed the solutions, and shaken the mixture repeatedly in a large bottle, let the whole be thrown upon a calico filter. When any further liquid ceases to trickle through, subject the filter, with its contents, to expression, and, having cleared the turbid tincture thus procured by filtration through paper, let it be added to that already obtained. The specific gravity of this tincture is 891.

PROPERTIES.—Tincture of the acetate of iron is a reddish-brown transparent liquid, with an ethereal odour, and an acid chalybeate taste. It is a solution of the acetate of the sesquioxide of iron in rectified spirit.

THERAPEUTICAL EFFECTS.—Acetate of iron possesses the properties of the ferruginous preparations generally; but as its composition is rather uncertain, it is not much used at present. The tincture was originally introduced into the pharmacopœia on the authority of Dr. Percival, who thought most highly of the chalybeate powers of this salt of iron. I have employed it extensively in the treatment of chlorosis and of chronic diseases of the heart, and am inclined to think most favorably of its remediate powers.

DOSE AND MODE OF ADMINISTRATION.—The dose is from min. xxx. to fʒj. Dr. Percival was in the habit of administering it in asses' milk.

FERRI AMMONIO-CHLORIDUM, L. *Ammonio-chloride of Iron.*

PREPARATION.—Sesquioxide of iron, ʒiij.; hydrochloric acid, Oss.; hydrochlorate of ammonia, lbiiss.; distilled water, Oij.; mix the sesquioxide of iron with the hydrochloric acid in a proper vessel, and digest them in a sand-bath for two hours; afterwards add the hydrochlorate of ammonia first dissolved in the distilled water; strain and evaporate all the liquor. Lastly, rub what remains to powder.

PROPERTIES.—This preparation is commonly met with in the form of an orange-yellow, semi-crystalline powder, which attracts moisture when exposed to the air. It emits a feeble odour when moistened, and has a saline metallic taste. It is readily dissolved by water and by weak spirit. According to Phillips it is a mechani-

cal mixture of 15 parts of sesquichloride of iron, and 85 parts of hydrochlorate of ammonia.

THERAPEUTICAL EFFECTS.—This preparation, the *Flores martiales* of the older pharmacologists, was at one time highly esteemed as a tonic and deobstruent in scrofulous affections; but, in consequence of its liability to become decomposed by keeping, and the variable quantity of iron which it contains, it is not often prescribed in the present day.

DOSE AND MODE OF ADMINISTRATION.—In the solid state, gr. v. to gr. xv.—*Tinctura Ferri Ammonio-chloridi*, L. (Ammonio-chloride of iron, $\bar{\text{z}}$ iv.; proof spirit, Oj.; dissolve the salt in the spirit and strain). Dose, min. xij. to min. xl.

INCOMPATIBLES.—Alkalies, and their carbonates; lime water; and all astringent vegetable preparations.

FERRI AMMONIO-CITRAS, D. *Ammonio-citrate of Iron; Ferro-citrate of Ammonia.*

PREPARATION.—Take of citric acid, four ounces; distilled water, sixteen ounces; sulphate of iron, five ounces; solution of ammonia, four fluid ounces, or as much as is sufficient: dissolve the citric acid in the water with the aid of heat, and, having converted the sulphate of iron into the hydrated peroxide of iron as directed in the formula for *Ferri Peroxydum Hydratum*, introduce the product into the capsule containing the solution of citric acid, and boil for twenty minutes. When the solution has cooled, add, constantly stirring, the ammonia in slight excess, and having transferred the solution thus obtained to delf dinner plates, evaporate it to dryness, by a steam or water heat. Lastly, chip off the film of dry salt which adheres to the plates, and preserve it in well-stopped bottles.

PHYSICAL PROPERTIES.—The ammonio-citrate of iron occurs in the form of semi-transparent shining scales, of a garnet-red colour, inodorous; it has a mildly styptic metallic taste.

CHEMICAL PROPERTIES.—The ammonio-citrate is a slightly deliquescent salt, it dissolves readily in cold or boiling water; and the solution is neutral to test paper. The composition of this preparation has been variously stated, but all chemists agree that the iron exists in it in the state of sesquioxide.

THERAPEUTICAL EFFECTS.—The ammonio-citrate of iron resembles much the tartrate to be next described, and is adapted for the same cases. Both these preparations are much milder in their effects than the mineral acid salts of the metal; they are consequently better adapted for delicate persons, and especially for cases in which the digestive organs are in an irritable state; but they are not so useful in anemic diseases.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. viij. in solution. By combining together 4 parts of citrate of iron, and 1 of citrate of quina, a preparation is obtained which has been named *Ferri et Quinæ Citras*; it may be given in doses of from gr. iij. to gr. vj. in the form of pill, in cases where a combination of these tonics is indicated. This salt is now commonly sold in the

shops, and a spurious article which contains no quina is very often substituted for it; the fraud may readily be detected by adding ammonia to the solution which will throw down the quina if any be present.—*Ferri et Magnesiæ Citras*, this preparation, which possesses the advantage over the ammonio-citrate of not being deliquescent, has recently been much used on the Continent. It is prepared by dissolving two parts by weight of recently precipitated hydrated sesquioxide of iron in a solution of three parts of citric acid, then saturating with carbonate of magnesia and evaporating to dryness. It is thus obtained in the form of shining brown scales; and may be given in powder or pill, in doses of from gr. ij. to gr. x. three times a day. It may also be given in solution sweetened with syrup.—*Aqua Chalybeata*; under this name, a solution of citrate of iron in water charged with carbonic acid and flavoured with bitter orange peel, has been introduced to the notice of the profession by Messrs. Bewley and Evans of this city. The exact formula for its preparation has not been made public; every f3vj. hold in solution gr. xiiij. of citrate of iron, it may therefore be given in doses of f3j. to f3ij. two or three times a day. It is the most agreeable form perhaps in which a ferruginous preparation can be administered, the only objection to its use being that it is apt to cause unpleasant eructations shortly after it has been taken; this may, however, be, to a great extent prevented by its not being drank until the effervescence has nearly ceased. It is very generally employed, being found an efficacious preparation of iron.—*Tinctura Ferri Aurantiacea*, WIRTEMBERG. (Iron filings, 3iv.; Seville oranges, 4. Remove the peel, the white, and the seeds; beat the pulp with the filings in a stone mortar, and let the paste remain at rest for two days; then pour upon it, Madeira wine, f3x. and tincture of orange peel, f3ij.; digest for seven days, express and filter). A very agreeable preparation; Dose, f3j. to f3iv.

INCOMPATIBLES.—The mineral acids; and all astringent vegetable preparations.

FERRI AMMONIO-TARTRAS. *Ammonio-tartrate of Iron.*

PREPARATION.—“Tartaric acid, 100 drachms; sesquicarbonate of ammonia, crystalline, 39½ drachms; sesqui-(*per*)-oxide of iron, 53½ drachms; muriatic acid 180 drachms; solution of ammonia, and water, of each, q. s.; dissolve the tartaric acid in cong. j. of water and add the sesquicarbonate of ammonia gradually. Dissolve the sesquioxide of iron in the muriatic acid by means of a gentle heat; dilute the solution with Ovj. of water, and add a sufficient quantity of solution of ammonia to precipitate the oxide. Separate this on a flannel filter, wash it with water, until the washings pass tasteless; and add it to the solution containing the bitartrate of ammonia, then apply a gentle heat, by means of a water-bath, until the whole of the sesquioxide of iron is dissolved, and a deep reddish-brown solution results. Lastly, evaporate this solution by means of a water-bath, to dryness.”—Mr. PROCTER, in the *American Journal of Pharmacy*.

PROPERTIES.—This preparation (which has been recently introduced into the practice of medicine, and is not contained in any of

the pharmacopœias), is met with in the form of brilliant scales, semitransparent, of a beautiful reddish-brown colour. It is odourless, and has a sweetish, slightly chalybeate taste. It is soluble in about its own weight of water at 60°, and in a much less quantity of boiling water. It is insoluble in absolute alcohol and in ether. It is composed of 1 equivalent of basic tartrate of sesqui-oxide of iron, 1 of tartrate of ammonia, and 4 of water.

THERAPEUTICAL EFFECTS.—This is an excellent preparation of iron, void of all astringency. It is peculiarly suited as a tonic for those derangements of the uterine organs in which the ferruginous salts are indicated. Its not disagreeable taste, its solubility in water, and the permanency of its composition give it an advantage over most of the other preparations of iron.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. viij. in the form of powder, pill, or solution ; or made into a bolus with honey.

INCOMPATIBLES.—The mineral acids ; and all astringent vegetable preparations.

FERRI BROMIDUM. *Bromide of Iron.*

PREPARATION.—"Bromine ; and clean iron filings, of each, equal parts ; heat together under water, till the fluid becomes of a greenish colour ; filter and evaporate to dryness." MAGENDIE.

Bromide of iron is of a brick-red colour, and has a disagreeable, styptic, metallic taste. It deliquesces rapidly when exposed to the air, and is very soluble in water. It has been used on the Continent, it is stated with much success, in hypertrophy of the uterus, and in glandular enlargements ; more recently it has been employed as a substitute for the iodide of iron. Dose, gr. iij. to gr. viij :—*Pilulæ Ferri Bromidi*, WERNECK. (Bromide of iron, 3j. ; extract of liquorice, a sufficiency ; mix and divide into 60 pills). One or two, morning or evening. It has been also employed externally in the form of ointment, prepared by rubbing together one part of the bromide and fifteen of prepared lard.

FERRI CARBONAS SACCHARATUM, D. E. *Saccharine Carbonate of Iron.*

PREPARATION. *Dublin.*—"Take of sulphate of iron, eight ounces ; crystallized carbonate of soda of commerce, ten ounces ; distilled water, two gallons ; refined sugar in fine powder, four ounces. With the sulphate of iron, carbonate of soda, and water, prepare, as directed for *Ferri carbonas*, a carbonate of iron, and immediately after it has been expressed, mix with it the refined sugar. Dry the mixture at a temperature not exceeding 212°, and, having reduced it to a fine powder, preserve it in a well stopped bottle." *Edinburgh.*—"Sulphate of iron, 3iv. ; carbonate of soda, 3v. ; pure sugar. 3ij. ; water, Oiv. ; dissolve the sulphate and carbonate, each in Oij. of the water ; add the solutions and mix them : collect the precipitate on a cloth filter, and immediately wash it with cold water, squeeze out as much of the water as possible,

and without delay triturate the pulp which remains, with the sugar previously in fine powder. Dry the mixture at a temperature not much above 120° ."

PHYSICAL PROPERTIES.—A grayish or bluish-green powder; inodorous, with a sweetish, strongly chalybeate taste.

CHEMICAL PROPERTIES.—This preparation is composed of "carbonate of protoxide of iron, in an undetermined state of combination, with sugar and sesqui-oxide of iron," *Edinburgh Pharmacopæia*. Sugar or other saccharine matter prevents the decomposition of the carbonate of the protoxide of iron, which always takes place rapidly from the conversion of the protoxide into the sesquioxide and the escape of carbonic acid. The saccharine carbonate remains unchanged for a long time, even when exposed to the air, but it eventually becomes converted into the sesquioxide; the Dublin College directs it to be dried at too high a temperature, a heat above 140° driving off most of the carbonic acid. It is insoluble in water or alcohol; but dissolves completely in hydrochloric acid with effervescence.

Adulterations.—This preparation is not liable to adulteration; that it has been properly prepared may be known by "its colour being grayish-green; and by its being easily soluble in muriatic acid, with brisk effervescence," *Edinburgh Pharmacopæia*. Dr. Christison states that when decomposed by an acid, fifty grains ought to yield 7.5 cubic inches of gas.

THERAPEUTICAL EFFECTS.—Carbonate of the protoxide of iron is one of the best and most active of the ferruginous salts and the permanency of its composition in the form now described renders this preparation a valuable addition to the *Materia Medica*. It is peculiarly adapted for children and delicate females, when the employment of a chalybeate tonic is indicated. Carbonate of iron held in solution by an excess of carbonic acid is the active principle of many chalybeate mineral waters.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xxx. in the form of powder, or made into an electuary with syrup or honey.—*Pilulæ Ferri Carbonatis*, E. (Saccharine carbonate of iron, 4 parts; red-rose conserve, 1 part; beat them into a proper mass, to be divided into five grain pills). Dose 1 to 4 pills.—In the following preparations, the carbonate of iron, prevented from undergoing decomposition by the presence of saccharine matter, is the active ingredient:—*Mistura Ferri composita*, D. L. E. ("Take of myrrh, in powder, one drachm; pure carbonate of potash half a drachm; essence of nutmeg one fluid drachm; rose water, eight fluid ounces; refined sugar, one drachm; sulphate of iron, half a drachm. Triturate the myrrh and carbonate of potash with the sugar, spirit of nutmeg, and seven ounces of the rose water, the latter being gradually added until a uniform mixture is obtained; to this add the sulphate of iron, previously dissolved in the remaining ounce of rose-water, and enclose the mixture at once in a bottle, which should be tightly corked." D.—"Myrrh, powdered, 3j.; carbonate of potash, 3j.; rose water, f3xviij.; sulphate of iron, powdered, ʒiiss.; spirit of nutmeg, f3j.; pure sugar, 3ij.; rub together the myrrh with the spirit

of nutmeg and the carbonate of potash, and to these, while rubbing, add first the rose water with the sugar, then the sulphate of iron. Put the mixture immediately into a proper glass vessel, and stop it," L. E.). This mixture, which was introduced into the pharmacopœias as a substitute for *Dr. Griffith's tonic mixture*, and by which name it is commonly known, is one of the best and most generally employed of the pharmaceutical preparations of iron. Its operation is stimulant as well as tonic, and consequently it should not be administered in cases where there is any tendency to inflammatory action in the digestive organs; the dose is fʒj. to fʒij. two or three times a day. As it does not keep well, it should only be prepared when wanted for use.—*Pilulæ Ferri compositæ*, L. (Myrrh, powdered, ʒij.; carbonate of soda; sulphate of iron; and treacle, of each, ʒj.; rub the myrrh with the carbonate of soda; then add the sulphate of iron, and make into a mass with treacle, rub them again; afterwards beat the whole, in a vessel previously warmed, until incorporated). Dose, gr. x. to gr. xx. two or three times a day. These pills become so hard when kept, as to be unfit for use.

INCOMPATIBLES.—Acids, and acidulous salts; and all astringent vegetable preparations.

FERRI IODIDUM, D. L. E. *Iodide of Iron. Proto-iodide of iron.*

PREPARATION. *Dublin*.—"Take of pure iodine, one ounce; filings or thin turnings of wrought iron, separated from impurities by a magnet, half an ounce; distilled water, five ounces. Introduce the iodine, iron, and four ounces of the water, into a Florence flask, and having heated the mixture gently for ten minutes, boil until the solution loses its red colour. Pass the liquid now through paper into a second flask, washing the filter with the remaining ounce of water, and by means of a regulated heat, boil down the liquor until a drop of it taken out on the end of an iron wire solidifies on cooling. When the flask has assumed the temperature of the air, let the iodide of iron be extracted from it (by breaking the flask if necessary), and after it has been submitted to powerful pressure, enveloped in blotting paper, let it be enclosed in a well stopped bottle." *London*.—"Iodine, ʒvj.; iron filings, ʒij.; distilled water, Oivss.; mix the iodine with Oiv. of the water, and to these add the iron. Heat them in a sand bath, and when it has acquired a greenish colour, pour off the liquor. Wash what remains with the half pint of water, boiling. Let the mixed and strained liquors evaporate at a heat not exceeding 212° in an iron vessel, that the salt may be dried. Keep in a well-stopped vessel, access of light being prevented." *Edinburgh*.—"Take any convenient quantity of iodine, iron wire, and distilled water, in the proportions for making syrup of iodide of iron, (*see below*). Proceed as directed for that process; but before filtering the solution, concentrate it to one-sixth of its volume, without removing the excess of iron wire. Put the filtered liquor quickly into an evaporating basin, with twelve times its weight of quick-lime around the basin, in some convenient apparatus in which it may be shut up accurately in a small space not communicating with the general atmosphere. Heat the whole apparatus in a hot-air press or otherwise until the water be entirely evaporated; and preserve the dry iodide in small well-closed bottles."—*FERRI IODIDI SYRUPUS*, D. E. *Dublin*.—"Take of pure iodine, five drachms; iron turnings, separated by a magnet, three drachms; distilled water, two ounces; simple syrup, six fluid ounces: introduce the iodine, iron, and water into a glass flask, and apply a moderate heat until the solution loses its red colour. Filter the solution while hot into a bottle containing the syrup, mix with agitation, and add distilled water, to make up eight fluid ounces. One fluid drachm contains about five grains of iodide of iron." *Edinburgh*.—"Iodine (dry), 200 grains; fine iron wire,

recently cleaned, 100 grains; white sugar, in powder, ʒivss. ; distilled water, fʒvj. ; boil the iodine, iron, and water together in a glass matrass, at first gently, to avoid the expulsion of iodine vapour, afterwards briskly till about fʒij. remain. Filter this quickly, while hot, into a matrass containing the sugar; dissolve the sugar with a gentle heat, and add distilled water to make up fʒvj. —Twelve minims contain one grain of iodide of iron.”—The following simple process for preparing iodide of iron has been recently proposed by M. Cap :—Bruise together in a large mortar, 4 parts of iodine and 2 parts of water; then add quickly 1 part of iron filings. Sufficient heat is produced to drive off 1 part of iodine in the state of vapour, when the mixture becomes liquid; to remove the excess of iron, it is to be dissolved in water and filtered. The filtered liquor is a solution of the iodide of iron free from oxide or per-oxide. This solution may be readily preserved, by adding a sufficiency of pure sugar to it, to convert it into a syrup.

PHYSICAL PROPERTIES.—Generally met with in small crystalline masses, of an iron-grey colour, opaque, and having a metallic lustre. It has a very styptic metallic taste.

CHEMICAL PROPERTIES.—Iodide of iron is composed of 1 equivalent of iodine and 1 of iron (Fe I), combined in the crystalline state with 5 equivalents of water. It is very deliquescent, and attracting oxygen from the air is converted into a mixture of sesquioxide and sesqui-iodide of iron; it dissolves readily in water and alcohol, but the solution when left exposed to the air is rapidly decomposed, and sesqui-oxide of iron deposited; which change is, however, prevented, if a sufficient quantity of sugar be present. Exposed to heat, it fuses, and at a temperature above 350° F. it is decomposed, the iodine being volatilized and the iron left in the state of peroxide. The formula of the Dublin Pharmacopœia yields an excellent preparation; it is that proposed by Messrs. Smith, of Edinburgh.

Adulterations.—That iodide of iron has been well prepared and properly preserved, may be readily known by its being entirely soluble in distilled water.

THERAPEUTICAL EFFECTS.—Iodide of iron was first employed in the practice of medicine by the late Dr. A. T. Thomson. In its operation on the system it is more nearly allied to the preparations of iron than to those of iodine, but to a certain extent it possesses the combined properties of both. Thus, as a tonic it has been found especially useful in scrofulous debility, and under its use strumous enlargements of the glandular system have been dissipated. It has also been administered with much benefit in chlorosis and amenorrhœa when the ferruginous preparations are indicated, and it is probably one of the most useful remedies that can be employed in the treatment of secondary syphilitic affections, occurring in scrofulous or debilitated habits. In large doses iodide of iron sometimes purges.

DOSE AND MODE OF ADMINISTRATION.—The dose of iodide of iron is gr. ij. to gr. v. gradually increased. It is so deliquescent a substance, and the solution of it decomposes so rapidly, that many methods have been proposed for preserving it unchanged in the form of solution; of these the only two that deserve notice are, keeping in the bottle in which it is contained a piece of iron wire as first

proposed by Mr. Squire of London, or forming it into a strong syrup as recommended by Dr. A. T. Thomson. The former method has been found very effectual, but it entails the necessity of filtering the solution every time it is to be used; while in the latter it is not only preserved for a length of time unaltered, but it is also an elegant form for the administration of the medicine. The syrup of the Dublin and Edinburgh pharmacopœias may be given in doses of from min. xv. to min. lx. simply dissolved in water, to which, however, it should not be added until just before it is swallowed. Owing to its great tendency to become deliquescent, and consequently to undergo decomposition, it is difficult to prescribe iodide of iron in the solid state. The best form for doing so, which has been hitherto published, is the following, communicated by Mr. Leslie of Glasgow to Professor Christison:—*Pilule Iodidi Ferri*, (Take of iodine, 127 grains; iron wire about the thickness of a thin quill, 3ss.; distilled water, min. lxxv. Agitate them briskly together in a strong ounce phial, provided with a well fitted glass stopper until the froth which forms becomes white, which will happen in less than ten minutes. Pour the liquid upon 3ij. of finely powdered loaf sugar, in a small mortar, and triturate immediately and briskly for a few minutes; add gradually a mixture of the following powders, viz., liquorice powder, 3ss.; powder of gum arabic, 5iss.; and flour, 3j.; divide the mass into 144 pills). In making this preparation, the bottle should be wrapped in a coarse towel, for fear of its bursting; and the stopper held in firmly. Each pill contains one grain of iodide of iron. I have used these pills in numerous cases for some years, and have found them the best form for administering this medicine.

INCOMPATIBLES.—Acids, and acidulous salts; and all substances incompatible with sulphate of iron, (see page 63).

FERRI LACTAS. *Lactate of Iron; Proto-lactate of Iron.*

PREPARATION.—Take any quantity of sour whey; evaporate it to a third or a fourth of its volume; decant, filter, and saturate with milk of lime. Separate the precipitated lactate of lime on a filter; treat it with solution of oxalic acid to precipitate the oxalate of lime. Add to the liquor, again filtered, (which is now a solution of lactic acid), clean iron filings; boil for a short time, filter, evaporate to the consistence of a syrup, and crystallize by cooling." LOURADOUR.

PHYSICAL PROPERTIES.—It occurs in the form of small greenish-yellow acicular prisms, or in powder of a dull, pale green colour, having a feeble chalybeate, not disagreeable taste, but no odour.

CHEMICAL PROPERTIES.—It is composed of 1 equivalent of protoxide of iron and 1 of lactic acid, combined in the crystalline state with 3 of water. It is but slightly soluble in water, and during solution the iron passes to a higher state of oxidation; when pure, the solution in distilled water is not affected by solution of nitrate

of baryta or of oxalate of ammonia. Proto-lactate of iron has an acid reaction on vegetable colours.

THERAPEUTICAL EFFECTS.—Lactate of iron has been administered in the same cases as the other mild preparations of this metal. It has been principally used in the treatment of chlorosis and atonic amenorrhœa, in which it has been found very successful. In consequence, however, of its high price, it has hitherto been but little employed in this country.

DOSE AND MODE OF ADMINISTRATION.—Gr. vj. to gr. xij. in the 24 hours. It is best given in the form of lozenge or of syrup.—*Trochisci Ferri Lactatis*, CAP. (Lactate of iron, 3vij. gr. lxxii.; pure sugar, 3xiss.; mucilage, q. s.; make into lozenges, each weighing gr. x.). Each lozenge contains gr. $\frac{3}{4}$ of the salt.—*Syrupus Ferri Lactatis*, CAP. (Lactate of iron, 3j.; boiling distilled water, f3viss.; pure sugar, 3xiij.; make into a syrup). Dose, f3ij. to f3ss.

INCOMPATIBLES.—Same as for the ammonio-citrate of iron.

FERRI MISTURA AROMATICA, D. *Aromatic mixture of Iron.*

PREPARATION.—Take of peruvian bark (crown or pale), in powder one ounce; calumba root in coarse powder, three drachms; cloves, bruised, two drachms; filings of iron, separated by a magnet, half an ounce; digest for three days, with occasional agitation, in a covered vessel, with as much peppermint water as will give twelve ounces of a filtered product, and then add of compound tincture of cardamoms, three fluid ounces; tincture of orange peel, three fluid drachms. This mixture should be kept in a well stopped bottle.

This mixture is a combination of aromatic tonics holding in solution some tannate of iron; in consequence of its black colour it is commonly known as *Heberden's ink*. Notwithstanding its being an unchemical compound, it is a most excellent tonic, and so highly thought of as to be retained in the last edition of the Dublin Pharmacopœia; it is in very general use in this city, in the various states of debility attended with anemia. Dose, f3j. to f3ij. two or three times a day.

FERRI MURIATIS TINCTURA, E. TINCTURA FERRI SESQUICHLORIDI, D. L. *Tincture of the muriate of Iron; Tincture of the sesquichloride of Iron.*

PREPARATION. *Dublin*—"Take of iron wire, eight ounces; pure muriatic acid, one quart; pure nitric acid, eighteen fluid drachms; distilled water, one pint; rectified spirit, one pint and a half. Dilute the muriatic acid with the water, and having poured the mixture on the iron, apply a gentle heat until the metal is dissolved. Next add the nitric acid in successive portions, and then evaporate at a gentle heat until the solution is reduced to one pint. Finally mix this in a bottle with the spirit, and, after the mixture has stood for twelve hours, draw off the clear tincture. The specific gravity of this tincture is 1237." *London. Edinburgh.*—"Sesqui-oxide (red-oxide, E.) of iron, 3vj.; hydrochloric (muriatic, E.) acid, Oj.; rectified spirit, Oij.; digest the oxide in the acid for 3 days in a glass vessel, with occasional agitation; then add the spirit and filter."

PHYSICAL PROPERTIES.—This preparation is transparent and of a reddish-brown colour, it has rather an agreeable odour of hydrochloric ether, and a very acid styptic taste.

CHEMICAL PROPERTIES.—It is a solution of sesqui-chloride of iron in rectified spirit, containing also free hydrochloric acid, and a trace of hydrochloric ether. It reddens litmus paper strongly. From the observations of Mr. Phillips, when prepared according to the London formula, its specific gravity is about 992, and f3j. yields by decomposition nearly gr. xxx. of sesquioxide of iron.

THERAPEUTICAL EFFECTS.—Tincture of the sesqui-chloride of iron, principally in consequence of the free hydrochloric acid which it contains, if taken in large doses acts as an irritant poison. In medicinal doses it is one of the most generally employed of the officinal preparations of iron, and may be used as a tonic in the cases in which they are indicated. It should be borne in mind, however, that it possesses astringent properties (on which account it is sometimes used as a topical agent to check bleeding from small vessels), and also that it is more irritant than the other preparations of the metal. Besides its tonic powers, it possesses some specific influence over the urinary organs, in many diseases of which it is employed with benefit. Thus it is found useful in irritability of the bladder, especially when occurring in females, in chronic mucous discharges from the urino-genital organs, in atonic hemorrhages from the kidneys and bladder, and in spasmodic stricture of the urethra preventing the introduction of a catheter. In the latter affection, its beneficial effects are generally ascribed to the nausea which it produces, and consequently it is administered in small but frequently repeated doses, min. x. to min. xij. every ten or fifteen minutes.

DOSE AND MODE OF ADMINISTRATION.—Min. x. to f3ss. gradually increased to f3j. or f3ij.; it is best administered in f3j. or f3ij. of water, or in white wine if nothing forbids the use of the latter; it may also be given in infusion of quassia.

INCOMPATIBLES.—The alkalis, and their carbonates; lime water; carbonate of lime; magnesia and its carbonate; solution of gum; and all astringent vegetable preparations.

In poisoning with this preparation, the treatment is the same as in poisoning with hydrochloric acid, (see page 138).

FERRI OXYDUM MAGNETICUM, D. FERRI OXIDUM NIGRUM, E.
Magnetic oxide of Iron ; Black oxide of Iron ; Ferroso-ferric-oxide of Iron.

PREPARATION. *Dublin.*—"Take of sulphate of iron, twelve ounces; solution of caustic potash, fifty-four ounces; distilled water, a sufficient quantity: convert as is directed in the formula for *Ferri Peroxydum Hydratum*, eight ounces of the sulphate of iron into a persulphate. To the solution thus obtained add the four remaining ounces of the sulphate of iron first dissolved in half a pint of distilled water. Mix well the resulting liquid with the solution of caustic potash, and, having boiled for five minutes in an iron vessel, collect the precipitate on a calico filter, and wash it with

boiling distilled water until the liquid which passes through ceases to give a precipitate when dropped into a solution of chloride of barium. Lastly, let the precipitate be dried by a steam or water heat, and, having been first reduced to a fine powder, let it be enclosed in a well-stopped bottle." *Edinburgh*—"Sulphate of iron, ℥vj.; sulphuric acid (commercial), ℥ij. fʒij.; pure nitric acid, ℥ivss.; stronger aqua ammonia, ℥iiss.; boiling water, Oij.; dissolve half the sulphate in half the water, and add the sulphuric acid; boil, add the nitric acid by degrees, boiling the liquid briskly after each addition for a few minutes. Dissolve the rest of the sulphate in the rest of the water, mix thoroughly the two solutions, and immediately add the ammonia in a full stream, stirring the mixture at the same time briskly. Collect the black powder on a calico filter, wash it with water till the water is scarcely precipitated by solution of nitrate of baryta, and dry it at a temperature not exceeding 180°."

PHYSICAL PROPERTIES.—This compound is met with native, when it constitutes *magnetic* iron ore. Prepared according to the directions of the pharmacopœias, it is a greyish black powder with a velvety smoothness. It is strongly magnetic.

CHEMICAL PROPERTIES.—It is a compound of 1 equivalent of the protoxide and 2 of the sesquioxide of iron, (Fe O , $2 \text{Fe}^2\text{O}^3$). Exposed to heat in close vessels it undergoes no alteration, but when heated in the open air it absorbs oxygen, and passes into the state of sesquioxide. It dissolves readily in hydrochloric acid without effervescence.

Adulterations.—Black oxide of iron sometimes contains metallic iron, when it does not dissolve completely in hydrochloric acid.

THERAPEUTICAL EFFECTS.—This preparation of iron is not much used in the present day, but formerly under the name of *Æthiops martis*, it bore a high reputation as a chalybeate tonic.

DOSE AND MODE OF ADMINISTRATION.—The dose of it is from gr. v. to gr. xx. two or three times a day, made into an electuary with honey or treacle.—*Ferruginous pills*, SCHNEIDER. (Black oxide of iron, in fine powder, 15 parts; calumba and canella, of each, in fine powder, 4 parts; cayenne pepper, 1 part; extract of chamomile, a sufficiency; make into a pill mass and divide into four grain pills). Dose, 3 to 5 daily. An excellent combination in chlorosis.

FERRI PEROXYDUM, D. FERRI OXIDUM RUBRUM, E. FERRI SESQUIOXYDUM, L. *Peroxide of Iron; Sesquioxide of Iron; Red oxide of iron.*

FERRI CARBONAS, D. *Carbonate of Iron.* As most of the carbonic acid is driven off during the drying of the carbonate, as directed by the Dublin College, and as the small quantity it retains escapes soon after it has been prepared, no matter how carefully it may be preserved—the resulting powder being the sesquioxide, I have thought it better to describe it along with the sesquioxide of iron.

PREPARATION.—FERRI PEROXYDUM, D.—"Take of hydrated peroxide of iron, any convenient quantity: place it in an oven, on a few folds of filtering paper, and when it has become dry to the touch, transfer it to a covered crucible, and expose it for a few minutes to an obscure red heat." FERRI SESQUIOXYDUM, L.—"Sulphate of iron,

℞iv.; carbonate of soda, ℞iv. ℥ij. ; boiling water, cong. vj. ; dissolve the sulphate of iron and carbonate of soda separately in cong. iij. of water; then the liquors being mixed together, set them by that the powder may subside. Lastly, the supernatant liquor being poured off, wash what is precipitated with water and dry it." *FERRI OXYDUM RUBRUM*, E.—" Sulphate of iron, ℥iv. ; carbonate of soda, ℥v. ; boiling water, Oss. ; cold water, Oiiiss. ; dissolve the sulphate in the boiling water; add the cold water, and then the carbonate of soda previously dissolved in about thrice its weight of water. Collect the precipitate on a calico filter, wash it with water till the water is but little affected by solution of nitrate of baryta; and dry it in the hot air press or over the vapour bath." *FERRI CARBONAS*, D.—" Take of sulphate of iron, eight ounces; crystallized carbonate of soda of commerce, ten ounces; distilled water, two gallons: dissolve each salt in one half of the water, and both solutions being raised to the boiling temperature, mix them, and set the whole to rest in a covered vessel for six hours. The supernatant solution having been drawn off with a syphon, the precipitate is to be drained on a calico filter, and then subjected to strong expression. Finally let it be dried at a temperature not exceeding 212° , pulverized, and preserved in a well-stopped bottle."

PHYSICAL PROPERTIES.—The sesquioxide of iron is when first prepared of a light reddish-brown colour, but becomes dark brown when dried; the carbonate of the Dublin pharmacopœia is of a reddish chocolate brown colour. Both are tasteless and odourless.

CHEMICAL PROPERTIES. Sesquioxide of iron is composed of 2 equivalents of iron, and 3 of oxygen, ($\text{Fe}^2 \text{O}^3$). It is insoluble in water, and is not readily dissolved by any acid except the hydrochloric, in which it dissolves freely, and if it be free from carbonic acid without effervescence.

Adulterations.—If it contain any earthy impurity, as brick dust, it will not be completely soluble in hydrochloric acid, aided by a gentle heat.

THERAPEUTICAL EFFECTS.—Sesquioxide of iron may be used as a chalybeate tonic in the same cases as the other ferruginous preparations. Its principal use, however, is in the treatment of neuralgic affections, particularly tic douloureux, as a remedy for which it was first proposed under the old name of *Carbonate*, by Mr. Hutchinson. In many instances it will be found to give complete relief, but it frequently fails to prove of the least service. The late Mr. Carmichael of this city highly recommended this preparation as a useful palliative in cancerous diseases.

DOSE AND MODE OF ADMINISTRATION.—The sesquioxide of iron is administered in doses of from ʒss. to ʒiv. three or four times a day. It may be given in the form of electuary made with honey, and some aromatic powder combined with it. *Emplastrum Ferri* (*Emplastrum Thuris*), D. (Take of peroxide of iron, in fine powder, one ounce; Burgundy pitch, two ounces; litharge plaster, eight ounces: add the peroxide of iron to the Burgundy pitch and litharge plaster, previously melted together, and stir the mixture constantly until it stiffens on cooling).—*Emplastrum Ferri*, E. (Litharge plaster, ʒiij.; resin, ʒvj.; olive oil, fʒiiss.; bees wax, ʒiij.; red oxide of iron, ʒj.; triturate the oxide of iron with the oil, and add the mixture to the other articles previously melted with a gentle heat; mix the whole thoroughly). These plasters are em-

ployed, spread on leather, to give mechanical support in muscular relaxations and weakness of the joints; by some they are believed to be tonic.

INCOMPATIBLES.—The mineral acids; and acidulous salts.

FERRI PERCYANIDUM, L. *Percyanide of Iron. Prussian Blue.*

This substance was introduced into the *Materia Medica* list of the London pharmacopœia solely as being employed for preparing bichloride of mercury. It has, however, been employed in America in the treatment of intermittent and remittent fevers, and in dysentery; for which it is stated to have proved a very effectual remedy. It has also been employed in Germany with success in some cases of old standing epilepsy. But according to more recent observations, it appears to possess very little, if any, therapeutical powers. The dose in which it has been administered is from gr. iij. to gr. vj. three or four times a day.

FERRI PHOSPHAS. *Phosphate of Iron.*

PREPARATION.—Take of sulphate of iron, $\mathfrak{Z}\text{v}$.; phosphate of soda, $\mathfrak{Z}\text{vj}$.; water, cong. j. Dissolve the sulphate of iron and phosphate of soda separately in Oiv. of the water; then mix the solutions; and set the mixture by that the powder may subside; lastly having poured off the supernatant liquor, wash the phosphate of iron with hot water, and dry it with a gentle heat.

PROPERTIES.—Phosphate of iron is in the form of a fine bluish or greenish-white power. It has a ferruginous taste, but no odour. According to Berzelius, it is a compound of the phosphates of the proto- and sesquioxides of iron. It is insoluble in water.

THERAPEUTICAL EFFECTS.—Phosphate of iron possesses the tonic properties of the other ferruginous preparations; it is so rarely used, however, in the present day, that it is not contained in the British or French Pharmacopœias. It appears to me to be peculiarly adapted for those scrofulous affections of children in which there is softening of the osseous system, and for rickets. In America it is employed in amenorrhœa and in some forms of dyspepsia.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. x. in powder or made into pill with extract of liquorice.

FERRI SULPHAS. *Sulphate of Iron* (described in the division *Astringents*), is an excellent tonic, and is employed with much benefit in the same cases as the other ferruginous compounds, provided its astringent property does not contra-indicate its use. I have found the dried sulphate (see page 62), combined with the pill of aloes and myrrh, produce excellent effects in the treatment of chlorosis.

FERRI TARTRAS. *Tartrate of Iron.*

The preparation often met with in the shops under this name is the *ammonio-tartrate* described before. In former editions of the British pharmacopœias, a wine of iron, *Vinum Ferri*, was contained, and is still frequently prescribed; the best method of preparing it is as follows:—*Vinum Ferri*, SOUBEIRAN. (Tartrate of protoxide of iron, 1 part; tartaric acid, 1 part; white wine, 1000 parts. Rub the tartrate of iron and tartaric acid together in a porcelain or glass mortar; then add the white wine, and filter the solution if necessary. Tartrate of protoxide of iron is readily prepared, by decomposing an equivalent of proto-sulphate of iron with an equivalent of neutral tartrate of potash, instantly washing the precipitate with water, collecting it on a strainer, pressing it strongly and drying over a water bath). The dose of the wine is from fʒj. to fʒss.

FERRUGO, E. FERRI PEROXYDUM HYDRATUM, D. *Hydrated Sesquioxide of Iron.*

PREPARATION.—*Dublin*.—"Take of sulphate of iron, eight ounces; pure sulphuric acid, six fluid drachms; pure nitric acid, half a fluid ounce; solution of caustic potash, one quart; distilled water, twelve ounces: to ten ounces of the water add the sulphuric acid, and in the mixture with the aid of heat dissolve the sulphate of iron. Mix the nitric acid with the remainder of the water, and, having added the diluted acid to the solution of sulphate of iron, concentrate by boiling, until, upon the sudden disengagement of much gas, the liquid passes from a dark to a red colour. Let this be now poured into the solution of caustic potash, and, when the mixture has been well stirred, place it on a calico filter, and let the precipitate be washed with distilled water until the liquid which passes through ceases to give a precipitate when dropped into a solution of chloride of barium. Lastly, enclose the precipitate, while in the pasty state, in a porcelain pot whose lid is made air tight by a luting of lard, so as to prevent the loss of water by evaporation." *Edinburgh*.—"Sulphate of iron, ʒiv.; sulphuric acid (commercial), fʒiiss.; nitric acid (D. 1380), fʒix.; stronger aqua ammoniæ, fʒiiiss.; water, Oij.; dissolve the sulphate in the water, add the sulphuric acid, and boil the solution; add then the nitric acid in small portions, boiling the liquid for a minute or two after each addition, until it acquires a yellowish-brown colour and yields a precipitate of the same colour to ammonia. Filter; let the liquid cool; and add in a full stream the aqua ammonia, stirring the mixture briskly. Collect the precipitate on a calico filter, wash it with water until the washings cease to precipitate with nitrate of baryta; squeeze out the water as much as possible; and dry the precipitate at a temperature not above 180°. When this preparation is kept as an antidote for poisoning with arsenic, it is preferable to preserve it in the moist state after being simply squeezed."

A hydrated peroxide of iron may also be readily prepared by precipitating the tincture of the muriate with ammonia.

PROPERTIES.—The hydrated sesquioxide of iron is in the form of a yellowish-brown powder, inodorous and tasteless. It is composed of 1 equivalent of sesquioxide of iron and 2 of water ($\text{Fe}^2\text{O}^3 + 2\text{HO}$). It is insoluble in water, but dissolves readily in dilute acids; heated it gives off water and a little ammonia, and the red peroxide of iron is left. If in the moist state the hydrated sesquioxide of iron in considerable excess (*at least 12 parts of oxide to 1 part of arsenic*, Dr. MacLagan) be agitated with a solution containing arsenious acid

a very insoluble compound (*arsenite of protoxide of iron*, Graham) is formed, and the filtered liquid gives no trace of arsenious acid.

THERAPEUTICAL EFFECTS.—In its medicinal properties this preparation is precisely similar to the dry sesqui-oxide. It has been advantageously introduced into the last editions of the Dublin and Edinburgh pharmacopœias, as being the most certain antidote for poisoning with arsenic which has yet been discovered. Its antidotal powers are now well established by the result of numerous cases, in which it has proved successful within the last fourteen years, both in this country and on the Continent. The quantity required to neutralize the poisonous property of arsenic, as above remarked, is at least 12 parts to 1 of the poison, but it should always be given in as large doses as the stomach will bear. Thus, a table-spoonful may be mixed with water, and this quantity administered every five or ten minutes. Hydrated sesquioxide of iron does not prove nearly so efficacious an antidote when dried, as when kept in the form of a moist magma.

FERRUM TARTARIZATUM, D. E. FERRI POTASSIO-TARTRAS, L.
Tartrate of Iron and potash; Potassio-tartrate of Iron; Ferric-tartrate of Potash.

PREPARATION.—*Dublin.*—"Take of sulphate of iron, eight ounces; white bitartrate of potash, five ounces; distilled water, one pint and a half: from the sulphate of iron prepare hydrated peroxide of iron, by the process given before, and having, immediately after it is washed, placed it with the bitartrate of potash and water in a porcelain capsule, apply heat to the mixture (taking care, however, that the temperature does not rise beyond 150°) and stir it occasionally for six hours. Let the solution, after it has cooled down to the temperature of the atmosphere, be decanted off any undissolved oxide of iron, and, having transferred it in small quantities to delf dinner-plates, let it be evaporated to dryness at a heat not exceeding 150°. Lastly, chip off the film of dry salt which adheres to the plates, and preserve it in well-stopped bottles." *London.*—"Sesquioxide of iron, ʒiij.; hydrochloric acid, Oss.; solution of potash, Oivss. or a sufficiency; bitartrate of potash, ʒixiss.; solution of sesquicarbonate of ammonia, Oj. or a sufficiency; distilled water, cong. iij.; mix the sesquioxide of iron with the acid, and digest for two hours in a sand-bath. Add to these, two gallons of the water, and set aside for an hour, then pour off the supernatant liquor. The solution of potash being added, wash what is precipitated frequently with water, and while moist boil it with the bitartrate of potash, previously mixed with a gallon of the water. If the liquor should be acid when tried by litmus, drop into it solution of sesquicarbonate of ammonia until it is saturated. Lastly, strain the liquor, and with a gentle heat let it evaporate, so that the salt may remain dry." *Edinburgh.*—"Sulphate of iron, ʒv.; bitartrate of potash, ʒv. ʒj.; carbonate of ammonia, in fine powder, a sufficiency. Prepare rust of iron from the sulphate as directed for *Ferrugo*, and without drying it. Mix the pulpy mass with Oiv. of water; add the bitartrate; boil till the rust of iron is dissolved; let the solution cool; pour off the clear liquid, and add to this the carbonate of ammonia so long as it occasions effervescence. Concentrate the liquid over the vapour bath to the consistence of thin extract, or till the residuum becomes on cooling a firm solid; which must be preserved in well-closed vessels."

PHYSICAL PROPERTIES.—This salt occurs in the form of a grayish

brown powder, with a greenish tint; it is inodorous, but has a somewhat styptic, not disagreeable taste.

CHEMICAL PROPERTIES.—It is composed of one equivalent of neutral tartrate of potash, and one equivalent of basic tartrate of sesquioxide of iron, (Phillips). It deliquesces slightly in damp air, is very soluble in water, requiring about 4 parts of cold water for its solution, and is slightly soluble in alcohol. The solution is of a greenish yellow colour; it is not decomposed by the alkalis or alkaline carbonates, unless with the aid of heat; and it will retain its composition unchanged for a considerable time.

Adulterations.—As met with in the shops, tartrate of iron and potash is often imperfectly prepared, the oxide of iron not being chemically combined with the bitartrate of potash. The tests of the *Edinburgh Pharmacopæia* will detect this as well as other faults which are likely to occur in the preparation:—"Entirely soluble in cold water; taste feebly chalybeate; the solution is not altered by aqua potassæ, and is not precipitated by solution of ferrocyanide of potassium." I have in several instances met with specimens of this salt which contained carbonate of potash; they were exceedingly deliquescent and effervesced with dilute acids.

THERAPEUTICAL EFFECTS.—This is a mild chalybeate tonic, and may be used in all cases where the milder preparations of iron are indicated. In consequence of its taste, it is well adapted for children.

DOSE AND MODE OF ADMINISTRATION.—Gr. v. to gr. xx. made into a bolus with honey or treacle, or dissolved in some aromatic water.

INCOMPATIBLES.—The mineral acids; lime water; and all astringent vegetable preparations.

GENTIANA, L. E. GENTIANA LUTEA, RADIX, D. *Gentian*; *Root of Gentiana lutea*. A native of the mountainous regions of central Europe; belonging to the Natural family *Gentianaceæ*, and to the Linnæan class and order *Pentandria Digynia*.

BOTANICAL CHARACTERS.—Root, perennial; Stem, annual, simple, erect, 3-4 feet high, roundish, hollow; Leaves, opposite, broad, ovate, 5-7 nerved, plaited; Flowers, yellow, whorled, numerous, on smooth peduncles; Fruit, a conical capsule, 2-valved, many-seeded.

PHYSICAL PROPERTIES.—Gentian root is imported in bales from Switzerland, by way of Havre, Marseilles, &c. It is in pieces varying in length from two or three to eight or ten inches, and from half an inch to one or two inches in thickness, usually contorted and much branched; the epidermis is wrinkled and somewhat annulated, of a brownish-yellow colour; internally the root is of a bright yellow colour, and has a spongy texture. It has a faint aromatic odour, which in the fresh state is said to be strong and disagreeable, and an intensely bitter taste, void of all astringency.

CHEMICAL PROPERTIES.—Gentian consists of odorous volatile oil, a yellow crystallizable bitter neutral principle (*gentianin* of M. M. Henry and Caventou; but which, according to Leconte and Troms-dorf, is a compound of simple colouring matter not bitter (*gentisin*), a bitter principle (*gentianite*), and fatty matter), a matter identical with bird-lime, green fixed oily matter, a free organic acid, uncrystallizable sugar, gum, yellow colouring matter, and lignin. Gentian imparts its active principles readily to cold or boiling water, alcohol, and ether.

Adulterations.—The roots of other species of gentian are frequently mixed with those of *Gentiana lutea*, an adulteration of little importance, as for the most part they possess analogous properties. A more serious fraud has, however, been sometimes practised, that of mixing the roots of belladonna, monkshood, or white hellebore with gentian; they may readily be detected, as they do not possess either the intense bitter taste or the bright yellow colour internally of gentian root. In France powdered gentian root is very commonly adulterated with *yellow ochre*, so much as 50 per cent. being often mixed with it. The fraud may be detected by boiling a small quantity of a suspected specimen for a few minutes with very dilute sulphuric acid, filtering, and testing the filtered liquor with tincture of galls; if any ochre had been present, a blackish precipitate will be produced.

THERAPEUTICAL EFFECTS.—Gentian is an excellent pure bitter tonic, and is one of the most commonly employed of this class of medicines. In large doses it often causes vomiting, and it has a tendency to relax the bowels. The diseases in which gentian is employed with most benefit are those forms of dyspepsia attended with torpid digestion and secretion of acid, but unaccompanied by any tendency to irritability or inflammation of the stomach. It is also a useful tonic in the debility attendant on chronic diseases; and in consequence of its bitterness it proves anthelmintic.

DOSE AND MODE OF ADMINISTRATION.—In powder, seldom used, gr. x. to gr. xxx.; as gentian possesses little if any aroma, aromatics are usually prescribed in combination with it.—*Infusum Gentianæ compositum*, D. L. *Infusum Gentianæ*, E. ("Take of gentian root, bruised; orange-peel, dried, of each two drachms; boiling water, half a pint: infuse for one hour in a covered vessel, and strain. The product should measure about eight ounces." D.—"Gentian, sliced; orange-peel, dried, of each, ʒij.; lemon-peel, fresh, ʒiv.; boiling distilled water, Oj.; macerate for an hour in a covered vessel, and strain," L.—"Gentian, sliced, ʒss.; bitter orange peel, dried and bruised, ʒj.; coriander, bruised, ʒj.; proof spirit, fʒiv.; cold water, fʒxvj.; pour the spirit on the solids; in three hours add the water; in twelve hours more strain through linen or calico," E.). The Edinburgh preparation keeps best, but the spirit it contains will in many cases render its use objectionable. The infusion of the Dublin and London Colleges soon spoils by keeping, it should therefore be prepared only when required for use. Dose,

f3ss. to f3ij.; it is an excellent vehicle for the alkaline bicarbonates. —*Mistura Gentianæ composita*, L. (Compound infusion of gentian, f3xij.; compound infusion of senna, f3vj.; compound tincture of cardamoms, f3ij.; mix). An excellent cathartic in constipation attended with debility of the digestive organs. Dose, f3j. to f3ij. —*Tinctura Gentianæ composita*, D. L. E. ("Gentian root, sliced (bruised, D.), 3iij. (3iiss., L.); bitter orange-peel, dried, 3iss. (3x., L.); cardamom seeds, bruised, 3ss. (3v., L.); proof spirit, Oij.; macerate for 14 days, and (strain, express, and filter, D.) strain," D. L. — "Gentian, sliced and bruised, 3ij.; dried bitter orange-peel, bruised, 3j.; canella, in moderately fine powder, 3ss.; cochineal, bruised, 3ss.; proof spirit, Oij.; digest for 7 days, strain, and express strongly; and then filter the liquor. This tincture may be more conveniently prepared by percolation, as directed for the compound tincture of cardamom," E.). Dose, f3j. to f3ij., generally used as an adjunct to the infusion. —*Tinctura Rhei et Gentianæ*, E. (Rhubarb, in moderately fine powder, 3ij.; gentian, finely cut or in coarse powder, 3ss.; proof spirit, Oij.; mix the powders and proceed as directed for tincture of cinchona). Stomachic and tonic, with mild laxative properties. Dose, f3j. to f3ij. —*Vinum Gentianæ compositum*, E. (Gentian, in coarse powder, 3ss.; yellow bark, in coarse powder, 3j.; bitter orange-peel, dried and sliced, 3ij.; canella, in coarse powder, 3j.; proof spirit, f3ivss.; sherry, f3xxxvj.; digest the root and bark for 24 hours in the spirit; add the wine and digest for 7 days more; strain and express the residue strongly, and filter the liquors). An excellent stomachic and tonic; Dose, f3ss. to f3j. —*Extractum Gentianæ*, D. L. E. ("Take of gentian root, in thin slices, one pound; distilled water, three pints: macerate the gentian in one pint and a half of the water for six hours, then strain and express. Add to the residue the remaining pint and a half of water, macerate again for six hours, strain and express. Finally, mix the liquors, and evaporate by a steam or water bath to a proper consistence," D. — "Gentian, sliced, 1biiss.; boiling distilled water, cong. ij; macerate for 24 hours; then boil down to a gallon, and strain the liquor while hot; lastly, evaporate to a proper consistence," L. — "Gentian, any convenient quantity; bruise it to a moderately fine powder; mix it thoroughly with half its weight of distilled water; in 12 hours put it into a percolator, and exhaust it by percolation with temperate distilled water. Concentrate the liquid; filter it before it becomes too thick, and evaporate in the vapour bath to the due consistence," E.). An excellent tonic extract; Dose, gr x. to 3ss. two or three times a day, in the form of a pill; in this state it may be prescribed with the preparations of iron.

INCOMPATIBLES.—Solution of diacetate of lead; nitrate of silver; sulphate of iron; and analogous salts.

MENYANTHES, L. E. *The common Buckbean. Leaves of Menyanthes trifoliata.* An indigenous plant, growing plentifully in marshy places; belonging to the Natural family *Gentianacæ*, and to the Linnæan class and order *Pentandria Monogynia*.

BOTANICAL CHARACTERS.—Roots, densely creeping and matted; Leaves, ternate, stalked; Leaflets, obovate, obscurely toothed: Flowerstalk, simple, from 5 to 8 inches high, bearing a compound raceme of many white flowers, tipped externally with red, and beautifully fringed with white filaments within.

The whole of this plant possesses a bitter taste, which it retains when dried; it contains bitter extractive, green colouring matter, albumen, starch, and a trace of tannic acid. Buckbean is a tonic of some power and may be used as an indigenous substitute for gentian. The dose of the dried leaves in powder is from gr. x. to ʒss.; or of an infusion (prepared with ʒj. of the dried leaves, and Oj. of boiling water), fʒj. to fʒij. An extract may be prepared in the same manner as extract of gentian, the dose of it would be from gr. x. to gr. xx.

INCOMPATIBLES.—The sesqui-salts of iron; nitrate of silver; and acetate of lead.

MYRRHA, D. L. E. *Myrrh; Gum-resinous exudation of Balsamodendron myrrha, D. L. Gummy resinous exudation of Balsamodendron (Protium?) myrrha, E.* A native of Gison on the borders of Arabia Felix and of Southern Abyssinia; belonging to the Natural family *Amyridacæ*, and to the Linnæan class and order *Octandria Monogynia*.

BOTANICAL CHARACTERS.—An arborescent shrub, with a pale ash-grey bark, and spinescent branches; Leaves, ternate, on short footstalks; Flowers, unknown; Fruit, somewhat larger than a pea, ovate, acuminate, brown.

PREPARATION.—Myrrh exudes from the tree like cherry-tree gum, issuing from natural fissures in the bark and from bruises made with stones; it is at first of the consistence of oil, but soon becomes hard and dark-coloured. It is imported into Britain by way of the East Indies.

PHYSICAL PROPERTIES.—Myrrh, like the other gums, is met with in commerce of different qualities. The finest, *Turkey Myrrh*, (so called because it was formerly imported by way of Turkey,) is in irregular-shaped tears or masses, varying in size from that of a pea to that of a chestnut, but pieces are often met with more than twice that size; they are semi-transparent, of a reddish-yellow or reddish-brown colour, the larger pieces being the darker coloured; their fracture is shining, somewhat fatty, presenting often small white striæ in the centre, particularly of the largest masses. The taste of myrrh is acrid and bitter, the odour agreeable and aromatic; the finer pieces of Turkey myrrh are often selected and sold under the name of picked myrrh. The inferior sorts, *East India myrrh*, are on an average in much smaller tears than Turkey myrrh; some of

the tears are almost transparent and of a very pale colour, others are dark brown; they are generally mixed with other gums.

CHEMICAL PROPERTIES.—Myrrh has been carefully analysed by Ruickoldt. Its specific gravity varies from 1.120 to 1.180. It is composed of 2.183 per cent. of volatile oil (*Myrrhol*), 44.760 of resin (*Myrrhin*), 40.818 of gum (*Arabin*), carbonates of lime and magnesia, and a trace of gypsum and oxide of iron. Its medicinal properties depend on the volatile oil and resin, both of which are dissolved out completely by rectified spirit, partially by proof spirit, and very slightly by water; the latter menstruum dissolves all the soluble gum, and forms with it a thicker mucilage than with gum acacia. By heat myrrh is softened, but does not melt; it is inflammable.

Adulterations.—Myrrh is frequently adulterated with the inferior sorts, and with other gum-resins. The finer pieces of Turkey myrrh should alone be employed in medicine. Righini has proposed the following method for ascertaining the purity of myrrh:—Reduce to very fine powder 4 parts each of myrrh and the muriate of ammonia, and triturate them together for about a quarter of an hour; then add gradually and with constant agitation, from 60 to 100 parts of water. If the myrrh be pure and does not contain any foreign bodies, the mixture dissolves readily.

THERAPEUTICAL EFFECTS.—Myrrh is a stimulating aromatic tonic, and is consequently inadmissible in cases where there is any tendency to inflammatory action. It is principally used in debilitated states of the digestive organs, or in diseases attended with excessive secretion from the mucous membranes. It is an excellent addition to alteratives and astringents in the protracted diarrhoeas of infancy and childhood. Myrrh was formerly in high esteem as an emmenagogue, but it has completely lost its reputation as such.

DOSE AND MODE OF ADMINISTRATION.—Gr. x. to gr. xxx. in powder or made into an emulsion with water.—*Decoctum Myrrhæ*, D. (Take of myrrh, two drachms; water, eight ounces and a half. Triturate the myrrh with the water gradually added, then boil for ten minutes, in a covered vessel, and strain. The product should measure about eight ounces). Dose, fʒss. to fʒj.—*Tinctura Myrrhæ*, D. L. E. (Myrrh in coarse powder (bruised L. in moderately fine powder, E.), ʒiv. (ʒiij. L. ʒiiss., E.); rectified spirit, Oij.; “macerate for 14 days, (strain, express, D.), and filter,” D. L.; “Pack the myrrh very gently without pressure in a percolator; then pour on the spirit; and when two pints have passed through, agitate well to dissolve the oleo-resinous matter which first passes, and which lies at the bottom. This tincture is much less conveniently prepared by the process of digestion for 7 days,” E.). The dose of this tincture for internal use is from fʒj. to fʒij. It is most generally employed diluted with water as a lotion in sponginess or ulceration of the gums; it is also used as a stimulant application to foul ulcers. When mixed with water, in consequence of the precipitation of the resin, a milky solution is formed.

QUASSIA, D. L. E. *Quassia*. The wood of *Picræna excelsa*, D. of *Quassia excelsa*, L.—chiefly of *Picræna excelsa*, and seldom of *Quassia amara*, E. The *Quassia* or *Picræna excelsa* is a native of Jamaica; belonging to the Natural family *Simarubaceæ*, and to the Linnæan class and order *Decandria Monogynia*. The *Quassia amara* or true quassia tree yields none of the quassia at present met with in British commerce; it is a native of the Continent of South America and of many of the West Indian islands.

BOTANICAL CHARACTERS.—*Picræna excelsa* is a tall handsome tree often attaining a height of 100 feet; Leaves, pinnated; Flowers, small, yellowish-green, in axillary, very compound racemes.

PHYSICAL PROPERTIES. Quassia wood is imported in billets from two to nine inches in diameter, covered with a brittle, reticulated, dark-brown bark. The wood is close, but light, of a pale yellow colour, odourless, with an intensely bitter taste. The billets are cut into chips for medical use.

CHEMICAL PROPERTIES.—It is composed of lignin, gummy matter, some salts of lime, a minute trace of volatile oil, and a peculiar, neutral bitter principle which has been named *quassin* or *quassite*. It yields its bitterness to boiling water and to alcohol.

Adulterations.—Quassia wood being scarce, other woods which resemble it in appearance are frequently substituted for it. They may be at once detected by their wanting the pure bitter taste of quassia; the infusion also of most of the spurious quassias is coloured blackish by the sesqui-salts of iron, but no effect is produced on the infusion of the true wood.

THERAPEUTICAL EFFECTS.—Quassia is amongst the most powerful of the pure bitters, and consequently is essentially tonic; according to some it possesses narcotic properties also, and it undoubtedly acts as a narcotic poison on insects and some of the lower animals. In medicine it is chiefly used in dyspepsia resulting from atony of the digestive organs, and is found particularly useful in that form of it which is produced by dissipation. The infusion forms an excellent vehicle for alkaline remedies in the acidity of the stomach of gouty and rheumatic habits, and for the saline purgatives in the constipation of atonic dyspepsia. Owing to its intense bitterness, quassia is no mean anthelmintic.

DOSE AND MODE OF ADMINISTRATION.—In consequence of the difficulty of reducing it to powder, quassia is not given in substance, the dose of it would be from gr. xv. to gr. xxx.—*Infusum Quassiae*, D. L. E. (“Take of quassia wood, rasped, one drachm; boiling water, eight ounces and a half. Infuse for one hour in a covered vessel, and strain. The product should measure about eight ounces.” D.—“Quassia sliced, ʒij. (3j. E.); boiling (distilled, L.) water, Oj.; infuse for two hours in a covered vessel, and strain,” L. E.). Dose fʒj. to fʒij.; if given in too large doses it is apt to occasion vomiting. The chalybeate preparations do not alter the colour of infusion of quassia, it may therefore be employed as a vehicle for

their administration. The Dublin infusion is too strong.—*Tinctura Quassiae*, E. (Quassia chips, 3x.; proof spirit, Oij.; macerate for 7 days and strain). Dose fʒj. to fʒij.—*Tinctura Quassiae composita*, E. (Cardamom seeds, bruised; and cochineal, bruised, of each ʒss.; cinnamon, in moderately fine powder; and quassia chips, of each ʒvj.; raisins, ʒvij.; proof spirit, Oij.; digest for 7 days, strain the liquor, express strongly the residuum, and filter. This tincture may be also made by percolation, as directed for compound tincture of cardamom, provided the quassia be rasped or in powder). An aromatic and bitter tonic; Dose, fʒj. to fʒss.—*Extractum Quassiae*, E. (To be prepared from quassia in the same way with extract of liquorice root). Dose gr. v. to gr. xv. in pill.

INCOMPATIBLES.—*With the infusion*. Nitrate of silver; and the acetates of lead.

SALIX, E. *Willow-bark*. *Bark of Salix caprea*. The genus salix is placed in the Natural family *Salicaceæ*, and in the Linnæan class and order *Dicæia Diandria*. There are no less than 64 species of Salix indigenous to the British islands; any of the species which possess a bitter tasting bark may be used in medicine.

BOTANICAL CHARACTERS.—Shrubs or trees. *Barren flowers*; Scales of the catkin, single flowered, imbricated, with a nectariferous gland; Perianth, none; Stamens, 1-5. *Fertile flowers*; Scales of the catkin, single-flowered, imbricated, with a nectariferous gland; Perianth, none; Stigmas, 2, often cleft; Capsule, 1-celled, 2-valved, many-seeded; Seeds, comose. HOOKER.

PHYSICAL PROPERTIES.—Dried willow-bark is met with in partially quilled pieces of from 6 to 8 inches in length; the epidermis is smooth and of a silver-gray colour. It is odourless, but has a very bitter, somewhat astringent taste.

CHEMICAL PROPERTIES.—Willow bark yields its properties to boiling water and to alcohol. Its constituents are tannin, resinous extractive, gummy matter, chlorophyle, yellowish colouring matter, an organic salt of magnesia, and a peculiar principle named *Salicin*, on which the febrifuge and tonic properties of the bark depend. The best process for preparing *Salicin* is that of Erdmann; it is as follows:—"Take of the bark of *Salix pentandra* (or of any other of the species, the bark of which tastes bitter), ℥bj.: macerate for 24 hours in milk of lime consisting of ʒij. of recently burned lime in Oviij. of water; then boil for half an hour. Pour off the liquor and repeat the process twice with the residuum. Mix all the decoctions; allow the mixture to settle, and pour off the clear liquor, concentrate to Oij.; digest with ʒviij. of animal charcoal, filter and evaporate to dryness. Exhaust with spirit containing 28 per cent. of alcohol, distill off the spirit, and purify the crystals which form, by boiling with animal charcoal and recrystallizing. Thus treated, ℥bj. of bark yields 3v. of salicin." Salicin crystallizes

in delicate, colourless, silky needles, which have an intensely bitter taste, but no odour; they are neutral. It is permanent in the air, is not altered at a temperature of 212° , fuses at 248° , and is decomposed at a higher temperature. It is soluble in 18 parts of cold, and in 1 of boiling water; is very soluble in alcohol, but insoluble in ether and oil of turpentine. Its composition in the crystalline state is $C^{26}H^{18}O^{14}$, (PIRIA). The presence of salicin in large quantity in willow-bark is indicated by sulphuric acid reddening a strong decoction.

THERAPEUTICAL EFFECTS.—Willow-bark is an excellent tonic and has been used successfully as a febrifuge. It may be employed in the same cases as cinchona bark, for which it forms an admirable indigenous substitute. Salicin resembles in its properties disulphate of quina, over which it possesses the advantage of not being so liable to irritate the stomach. I have used it very extensively as a tonic in the debility following acute diseases, particularly in cases accompanied by irritability of the digestive organs, and consider its powers to be fully equal to those of disulphate of quina.

DOSE AND MODE OF ADMINISTRATION.—Of the powdered bark, ʒss. to ʒj.—*Salicin*; As a tonic, gr. ij. three or four times a day; as a febrifuge, ʒj. to ʒij. in divided doses during the intermission. It may be given in powder combined with sugar or some aromatic powder; or dissolved in water sweetened with some agreeable syrup, as syrup of orange-peel, or syrup of *Hemidesmus indicus*.

INCOMPATIBLES.—Ammonia and its carbonates; lime water; carbonate of potash; the sesquisalts of iron; acetate of lead; corrosive sublimate; and sulphate of zinc.

SIMARUBA, L. E. SIMARUBA AMARA, CORTEX RADICIS, D.—*Simaruba.* Bark of the root of *Simaruba amara*, D. E.—of *Simaruba officinalis*, L. The same tree is indicated by the three Colleges, but the nomenclature of different botanists has been adopted. It is a native of Jamaica and Guiana, and belongs to the Natural family *Simarubaceæ*, and to the Linnæan class and order *Decandria Monogynia*.

BOTANICAL CHARACTERS.—A tall tree, with long creeping roots; Leaves, alternate, pinnate; Flowers, small, whitish, diœcious, in panicles; Fruit, 5 ovate, smooth, black capsules, placed on a fleshy disk.

PHYSICAL PROPERTIES.—The bark of the root is alone officinal, it is imported from Jamaica, and is in long pieces folded flat, covered with a reddish yellow epidermis, wrinkled and warty: the inner surface of the bark is yellowish-brown. It has a bitter, persistent taste, but no odour.

CHEMICAL PROPERTIES.—Simaruba bark contains a trace of volatile oil, resinous matter, *ulmin* (a bitter principle analogous to *quassin*), lignin and some salts. It yields its properties readily to water and to alcohol.

THERAPEUTICAL EFFECTS.—Simaruba is a bitter tonic, not much prescribed in the present day; in large doses it produces vomiting and purging. It has been highly praised for its remediate powers in chronic diarrhœa and dysentery, by many practitioners both on the Continent and in this country. As a bitter tonic it is, however, much inferior to many remedies of this class.

DOSE AND MODE OF ADMINISTRATION.—It is not given in powder; the following is its only officinal preparation.—*Infusum Simarubæ*, D. L. E. (“Take of Simaruba root-bark, bruised, two drachms; boiling water, nine ounces: infuse for one hour, in a covered vessel, and strain. The product should measure about eight ounces,” D.—“Simaruba, bruised, ʒiij.; boiling (distilled, L.) water, Oj.; infuse for two hours in a covered vessel, and strain, (through linen or calico, E.),” L. E.) Dose, fʒj. to fʒij.

INCOMPATIBLES. Lime water; alkaline carbonates; the salts of lead, mercury, and silver; and astringent vegetable infusions or decoctions.

TARAXACUM, L. E. TARAXACUM DENS-LEONIS, RADIX, D. Dandelion; The root of *Taraxacum dens-leonis*, D. E.—of *Leontodon Taraxacum*, L. Indigenous; belonging to the Natural family *Compositæ* (*Asteraceæ*, Lindley), and to the Linnæan class and order *Syngenesia Æqualis*.

BOTANICAL CHARACTERS.—Root, perennial, spindle-shaped; Leaves, all radical, runcinate, glabrous, toothed; Scape, with a single, large, yellow flower.

PHYSICAL PROPERTIES.—The whole of the dandelion plant abounds in a milky juice, which is most abundant in the months of August and September, at which season it should be gathered for medical use. The juice has a bitter taste but no odour.

CHEMICAL PROPERTIES.—Dandelion juice contains mannite, resin, gum, caoutchouc, various salts, and a peculiar bitter extractive, which has been obtained by M. Poley in a crystalline state and named by him *Taraxacine*; the latter is probably the active principle of the plant. Dandelion root and herb yield their properties to boiling water.

THERAPEUTICAL EFFECTS.—Dandelion is a useful tonic in chronic diseases of the liver, and in other affections accompanied by derangement of the biliary organs, as in some forms of dyspepsia and of cutaneous disease. It is also held by many to be diuretic and aperient, but these effects are not produced unless it be given in very large doses.

DOSE AND MODE OF ADMINISTRATION.—*Decoctum Taraxaci*, E. (*Taraxacum* herb and root, fresh, ʒviij.; water, Oij.; boil down to Oj.; squeeze and strain). Dose, fʒj. to fʒij.—*Extractum Taraxaci*, L. E. (“Proceed as for extract of gentian, employing the fresh root,” L.—“Fresh dandelion root, lbj.; boiling water, cong. j.;

proceed as for extract of poppy heads," E.). When properly prepared this extract is of a fine brown colour, and has a bitter, not *sweet*, taste. Dose, gr. x. to 3ss.—*Liquor Taraxaci*, (Fresh dandelion roots, cleaned dried and sliced, 3xij.; infuse for 24 hours in a sufficient quantity of distilled water to cover them. Press and set aside that the fecula may subside; decant and heat the clear liquor to 180° F.; filter the liquid whilst hot, and evaporate spontaneously until the product measures 3xij., to this add f3iv. of rectified spirit). When properly prepared, this liquid resembles in colour pale sherry; it is the best preparation of dandelion. The dose of it is from min. x. to min. xl.

INCOMPATIBLES.—Acetate of lead; the sesqui-salts of iron; corrosive sublimate: nitrate of silver, and infusion of galls.

ULMUS, L. *Elm-bark*. The inner bark of *Ulmus campestris*. Indigenous; belonging to the Natural family *Cupuliferae* (*Ulmaceae*, Lindley), and to the Linnæan class and order *Pentandria Digynia*.

BOTANICAL CHARACTERS.—A large tree, with rugged bark; Leaves, rhomboid-ovate, acuminate, wedge-shaped, and oblique at the base; Flowers, in dense heads, each subtended by a small scale.

PROPERTIES.—The inner bark alone of the elm should be used in medicine; it is of a reddish-yellow colour, inodorous, with a bitter, somewhat astringent taste. It contains resin, gum, tannin, mucus-extractive and some salts. Its active principles are extracted by boiling water.

THERAPEUTICAL EFFECTS.—Elm bark though at present but little employed in medicine, is a useful tonic; the decoction if taken in large quantity determines to the skin, and consequently is of much service in the treatment of cutaneous affections especially when occurring in debilitated habits; in such cases I am in the habit of using it very extensively and with much benefit.

DOSE AND MODE OF ADMINISTRATION.—Used only in the form of decoction.—*Decoctum Ulmi*, L. (Fresh elm bark, 3iiss.; distilled water. Oij. boil down to Oj., and strain). Dose, f3iv. to f3vj. three or four times a day. The fresh inner bark should be always used in preparing this decoction.

INCOMPATIBLES.—Sulphate of iron; acetate of lead; nitrate of silver; and gelatin.

ZINCI OXYDUM. *Oxide of zinc* (described in the division *Astringents*), is employed internally as a tonic in some forms of convulsive and spasmodic diseases, particularly epilepsy, in which it has been found in many instances beneficial, but its use must be persevered in for a considerable period. It may be given in powder or in pill,

in doses of gr. j. or gr. ij. gradually increased to gr. x. twice daily.

ZINCI SULPHAS. *Sulphate of Zinc* (described in the division *Astringents*), has also been administered as a tonic in spasmodic diseases, but its utility in their treatment is very doubtful.

CHAPTER XXII.

SUPPLEMENTARY AGENTS.

In this chapter are included the different articles which, though not employed in medicine for their remediate powers, are in frequent use as *Colouring agents*, *Perfumes*, *Tests*, and *Pharmaceutical agents*.

ALCOHOL AMYLICUM, D. *Fusel oil*. This oily fluid has been referred to at page 40; it has been introduced into the last edition of the Dublin Pharmacopœia, as valerianic acid is directed to be prepared from it.

PREPARATION.—*Dublin*.—"Take of the light liquid which may be obtained at any large distillery by continuing the distillation for some time after the pure spirit has been all drawn off, any convenient quantity. Introduce it into a small still or retort connected with a condenser, and apply heat, so as to cause distillation. As soon as the oil begins to come over unmixed with water, the receiver should be changed, and the distillation being resumed and carried nearly to dryness, the desired product will be obtained. The liquid drawn over during the first part of the distillation will consist of an aqueous fluid, surmounted by a stratum of the fusel oil. This latter, though impregnated with a minute quantity of water, should be separated and preserved, as being sufficiently pure for use."

AMMONIÆ OXALAS, E. *Oxalate of Ammonia*.

PREPARATION.—*Edinburgh*.—"Oxalic acid, ℥iv.; carbonate of ammonia, ℥viij.; distilled water, Oiv.; dissolve the carbonate in the water, add gradually the acid, boil, and concentrate sufficiently for crystals to form on cooling."

This salt is not used in medicine. It was introduced into the last edition of the *Edinburgh Pharmacopœia*, as a test for lime and its salts, with which it forms a white precipitate, soluble in nitric acid, but only sparingly soluble in hydrochloric acid.

AQUA FONTANA, D. *Spring Water*.

AQUA DESTILLATA, D. L. E. *Distilled Water*.

PREPARATION.—*Dublin*.—"Take of spring, or river water, any convenient quantity. Having introduced it into a copper still connected with a block-tin worm, or a Liebig's condenser, draw over about one-fortieth by distillation; this being rejected, continue the process until only about one-fifth of the original volume of the water remains in the still. Let the distilled water be preserved in well-stopped bottles."
London.—"Water, cong. x.; first let Oij. distil, which being thrown away, let cong. viij.

distil. Keep the distilled water in a glass vessel." *Edinburgh*.—"Take any convenient quantity of spring water, distil it from a proper vessel, rejecting the first twentieth, and preserving the first half of the remainder."

Spring and river water contain foreign matters, which render them unfit for many pharmaceutical purposes, and as vehicles for many medicines; the above processes for their purification are therefore directed by the Colleges. In the *Edinburgh Pharmacopæia*, the following tests for the purity of distilled water are given:—"Free of colour and odour, unaltered by sulphuretted hydrogen or nitrate of silver, nitrate of baryta, or oxalate of ammonia."

ARGENTUM PURIFICATUM, D. ARGENTUM, L. E. *Refined Silver; Silver; Metallic Silver.*

Silver is employed in pharmacy for preparing the nitrate. As met with in the shops, it usually contains traces of gold, copper, and lead; its freedom from which being desirable for the above purpose, the following tests for its purity are given:—*London. Edinburgh.* "Entirely soluble in diluted nitric acid; this solution treated with an excess of solution of muriate of soda, gives a white precipitate entirely soluble in aqua ammonia, and a fluid which is not affected by sulphuretted hydrogen. (Specific gravity, 10·4, L.)."

ARGENTI CYANIDUM, L. *Cyanide of Silver; Hydrocyanate of Silver.*

PREPARATION.—*London*.—"Nitrate of silver, ʒij . ʒij .; diluted hydrocyanic acid, and distilled water, of each, Oj .; dissolve the nitrate of silver in the water, and add to them the diluted hydrocyanic acid, and mix. Wash what is precipitated with distilled water and dry it."

This preparation has been introduced into the London Pharmacopœia, as a source of hydrocyanic acid, (see page 293).

ARGENTI AMMONIATI SOLUTIO, E. *Solution of Ammoniaco-nitrate of Silver.*

PREPARATION.—*Edinburgh*.—"Nitrate of silver, gr. xlv.; distilled water, fʒj .; aqua ammoniæ, a sufficiency; dissolve the salt in the water, and add the aqua ammoniæ gradually, and towards the end cautiously, till the precipitate at first thrown down is nearly, but not entirely redissolved."

This solution is employed as a very delicate test for arsenic acid, (see page 144).

AURANTHI FLORES, L. *Orange flowers. The flowers of Citrus aurantium.*

AURANTH OLEUM, L. E. *Oil of orange; Oil of Neroli; The oil distilled from the flowers of Citrus aurantium, L.—Volatile oil of the flowers of Citrus vulgaris, and sometimes of Citrus aurantium, E.*

AURANTH AQUA, L. E. *Orange-flower water; Distilled water of the flowers of Citrus aurantium, L.—of Citrus vulgaris, and sometimes of Citrus aurantium, E.*

The *Citrus aurantium* has been described in the division *Refrigerants*, and the *Citrus vulgaris*, in the division *Tonics*. Orange flowers have a very agreeable odour, which depends on volatile oil; it is completely dissipated by drying. The volatile oil may be procured by distillation with water; it is imported into Britain from France and the South of Europe. It has been introduced into the London and Edinburgh Pharmacopœias on account of its agreeable odour, and as an agent for the extemporaneous preparation of orange-flower water.

Orange-flower water is an article of the *Materia Medica* in the Edinburgh Pharmacopœia, it being usually imported; the London College has given the following formula for its preparation.—*Aqua Florum Aurantii*, L. “Orange flowers, lbx.; proof spirit, f3vij.; water, cong. ij.; let a gallon distil.” It is only employed on account of its fragrant odour as a vehicle for other medicines. As imported it is often impure and frequently contains traces of lead or copper; its purity may be known by “its being nearly colourless, and unaffected by sulphuretted hydrogen gas,” *Edinburgh Pharmacopœia*. A most agreeable syrup, *Syrupus Florum Aurantii*, may be prepared by dissolving a sufficiency of sugar in it without heat.

BARYTÆ CARBONAS, D. L. E. *Carbonate of Baryta*. This substance is found native in many parts of England, and is known to mineralogists by the name of *Witherite*. It is introduced into the pharmacopœias as being employed for the preparation of chloride of barium. It acts as a narcotico-acrid poison on animals and on man.

BARYTÆ NITRAS, E. *Nitrate of Baryta*.

PREPARATION.—BARYTÆ NITRAS, E. “To be prepared like the muriate of baryta, substituting pure nitric for muriatic acid.”—SOLUTIO BARYTÆ NITRATIS, E. “Nitrate of baryta, 40 grains; distilled water, 800 grains; dissolve the salt in the water, and keep the solution in well closed bottles.”

This salt is not used in medicine; it is directed to be employed by the Edinburgh College as a test, and formulæ are given for its preparation and for a solution of a given strength.

BARYTÆ SULPHAS, D. E. *Sulphate of Baryta; Heavy Spar*.

Not employed in medicine; used in pharmacy for the preparation of chloride of barium.

BERGAMII OLEUM, L. BERGAMOTÆ OLEUM, E. *Oil of Bergamot*; The oil distilled from the rind of the fruit of *Citrus limetta bergamium*, L.—*Volatile oil of the rind of the fruit of Citrus limetta*, E. The bergamot citrus is cultivated in the South of Europe, and belongs to the Natural family *Aurantiaceæ*, and to the Linnæan class and order *Polyadelphia Polyandria*.

Oil of bergamot exists in the rind of the fruit, from which it is obtained either by expression or distillation; it is imported from the South of Europe. It is of a pale greenish-yellow colour, has a peculiar fragrant odour, and a warm pungent taste. Its specific gravity is 0.862. It is only employed in medicine as a perfume, chiefly to give an agreeable odour to ointments.

BISMUTHUM, D. L. E. *Bismuth*; *Metallic Bismuth*.

This metal is only employed in pharmacy for preparing the tris-nitrate. As met with in the shops it frequently contains traces of copper or iron; its freedom from which being requisite for the above purpose, the following tests for ascertaining its purity are given by the London and Edinburgh Colleges:—"It is dissolved by diluted nitric acid; when subnitrate of bismuth is precipitated from this solution by ammonia, the liquor is free from colour. Its specific gravity is 9.8," L.—"Entirely soluble in nitric acid with the aid of heat; and the solution is colourless or nearly so, and deposits a white powder when much diluted with cold water," E.

CALCIS PHOSPHAS PRÆCIPITATUM, D. *Precipitated phosphate of Lime*; *Bone-phosphate of Lime*; *Sub-phosphate of Lime*.

PREPARATION.—Take of ox-bones, burned to whiteness in a clear fire, four ounces; pure muriatic acid, six fluid ounces; distilled water, one quart; solution of ammonia, eleven fluid ounces; or as much as may be sufficient. Reduce the calcined bones to a fine powder, and digest upon this the acid, diluted with a pint of the water, until it is dissolved. To the solution, first cleared (if necessary) by filtration, add the remainder of the water, and then the solution of ammonia, until the mixture acquires an alkaline reaction, and having collected the precipitate upon a calico filter, let it be washed with boiling distilled water as long as the liquid which passes through gives rise to a precipitate, when permitted to drop into a solution of nitrate of silver acidulated with nitric acid. The washed product should now be dried by exposing it for some days on porous bricks to a warm atmosphere.

Bone-phosphate of lime is composed of 8 equivalents of lime, and 3 of phosphoric acid ($8\text{CaO} + 3\text{PO}^5$). It was formerly employed in medicine, in rickets and mollities ossium, on the supposition of its

affording bone-earth to the osseous system; but the fallacy of such a doctrine is well understood now, and at present it is only used in pharmacy for preparing phosphorus and phosphate of soda.

CALX RECENS USTA, D. L. CALX, L. E. *Quick-lime, fresh burnt; Lime.*

PREPARATION.—*Calx*, L. E.—“Take of chalk, lbj.; break it into small pieces, and burn it in a very strong fire for an hour,” L.—“Heat white marble broken into fragments, in a covered crucible at a full red heat for 3 hours, or till the residuum, when slaked and suspended in water, no longer effervesces on the addition of muriatic acid,” E.

Quick-lime is used for making the officinal preparations. Its purity is known by its dissolving entirely and without effervescence in hydrochloric acid; the solution not precipitating with ammonia.

CARBO ANIMALIS, D. L. E. *Animal-charcoal; Ivory-black, D.—obtained from bones, E.—and flesh, L.*

Animal charcoal is usually prepared by calcining the bones of animals in close vessels; thus obtained, it contains phosphate and carbonate of lime, which would unfit it for the purposes to which it is applied in pharmacy, namely, that of acting as a decolorizing agent in the preparation of the vegetable alkaloids; processes are consequently given in the pharmacopœias for purifying the commercial article.

PREPARATION. — CARBO ANIMALIS PURIFICATUS, D. L. E. — “Take of ivory black, five pounds; muriatic acid of commerce, three pints; water, three gallons and three pints; distilled water as much as is necessary. To the acid, diluted with three pints of water, gradually add the ivory black, and digest, with repeated stirring, at a gentle heat for twenty-four hours. Pour on now a gallon of water, and when, after the mixture has been well agitated, the insoluble matters have subsided, remove the clear solution by decantation or the syphon. Let this be done a second and a third time. Place now the black sediment on a calico filter, and wash it with distilled water, until the washings cease to give a precipitate with nitrate of silver. Finally, let the product be dried in a stove or oven, a gentle heat being at first applied, which must be finally raised to between 300° and 400°,” D.—“Animal charcoal, lbj.; hydrochloric acid, and water, of each, f℥xij.; mix the hydrochloric acid with the water, and pour it gradually upon the charcoal, then digest for two days with a gentle heat, frequently shaking them. Set by, and pour off the supernatant liquor, then wash the charcoal very often with water, until nothing acid is precipitated; lastly, dry it,” L.—“Ivory-black, lbj.; commercial muriatic acid, and water, of each, f℥xij.; mix the acid and water, add gradually the ivory-black, stirring occasionally. Digest with a gentle heat, for two days, agitating from time to time; then boil, dilute with two pints of water, collect the undissolved charcoal on a filter of linen or calico, and wash it with water till what passes through scarcely precipitates with solution of carbonate of soda. Heat the charcoal first moderately and then to redness in a closely covered crucible,” E.

After animal charcoal has been employed as a decolorizing agent, it loses its powers as such; which, however, may be again restored

to it by drying and heating to redness. When properly prepared, "if it be incinerated with its own volume of red-oxide of mercury, it is dissipated, leaving only a scanty ash," *Edinburgh Pharmacopœia*.

CARBO LIGNI, D. L. E. *Wood-charcoal.*

Wood-charcoal is obtained by burning billets of wood, the access of air being prevented. It is an article of the *Materia Medica* in the three *Pharmacopœias*, being prepared on the large scale for various uses in the arts, particularly for the manufacture of gunpowder. In medicine it is at present only employed to destroy fetor; for which purpose it is used in the form of powder or poultice to gangrenous sores, phagedenic ulcers, &c.; it is also used as a dentifrice, for which it is very generally employed, as by its mechanical action it removes incrustations from the teeth, and by its antiseptic powers it corrects fetor of the breath. Charcoal has been employed in the treatment of various diseases, but the only one in which it is ever employed in this country is dysentery, and in it merely to correct the fetor of the evacuations, for which purpose it is given in doses of gr. xx. frequently repeated. More recently it has been used in Paris in large doses, four or five teaspoonfuls before and after meals, in the treatment of painful affections of the digestive organs; its effects are said to be most beneficial: for this purpose it is directed to be prepared from the wood of the poplar and to be very finely powdered.

COCCHI, L. E. COCCUS CACTI, D. *Cochineal.* *The entire insect, Coccus cacti.* A native of Mexico; belonging to the class *Insecta*, order *Hemiptera*. The cochineal insect and the plant on which it feeds have been recently introduced into Algeria; and France is now to a great extent supplied with cochineal from that colony.

The cochineal insect feeds chiefly on the Nopal plant (*Opuntia cochinillifera*), large plantations of which are cultivated for its nourishment in Mexico. The insects are collected three times a year, killed by immersion in boiling water, and dried with stove-heat; the first gathering is the best, consisting entirely of impregnated females, when they are of the largest size, and afford more colouring matter. As met with in commerce, cochineal is in the form of small roundish grains (each grain being a separate insect); they are wrinkled, from one to two lines long, and of a silvery-purplish colour. They are inodorous, but have a rather bitter taste. Cochineal consists of some peculiar fatty substance, and a brilliant purplish-red colouring matter which has been named *cochinillin*; and which is a principal constituent in the pigment technically known as *carmine*.

Cochineal was at one time supposed to possess anodyne proper-

ties, and was employed in medicine in the treatment of hooping-cough and neuralgia: as a remedy for the former disease, its use has been again resorted to latterly in many parts of the Continent, particularly in Germany. The tincture has been introduced into the last edition of the Dublin Pharmacopœia.—*Tinctura Cocci Cacti*, D. (Take of cochineal, in fine powder, two ounces; proof spirit, one pint. Macerate for fourteen days, strain, express, and filter). It may be given internally in doses of from f3ss. to f3ij.

CORNU, L. E. *Hartshorn shavings; The Horns of Cervus elephas.*

Hartshorn shavings are introduced into the Materia Medica as being employed in the preparation of antimonial powder (see page 153); boiled with water, they form a jelly similar to that obtained from cow-heels, calves' feet, &c. Calcined hartshorn is officinal in the London Pharmacopœia; it is nearly similar in composition to the *bone-phosphate of lime*, and was used for the same purposes (See page 487).—*Cornu ustum*, L. "Burn pieces of hartshorn in an open vessel until they become perfectly white; and then proceeding as for *prepared chalk*, reduce them to very fine powder."

CURCUMA, L. E. *Turmeric. Rhizome of Curcuma longa.* A native of the East Indies and of China; belonging to the natural family *Zingiberaceæ*, and to the Linnean class and order *Monandria Monogynia*.

Turmeric is in short, roundish, somewhat curved pieces, about the thickness of the little finger, reddish-yellow externally, reddish-brown within; it has a peculiar aromatic odour, and a warm bitter taste. The colouring principle of turmeric has been obtained in a separate state by treating the alcoholic extract with ether; it has been named *curcumin*. Turmeric possesses some aromatic properties in consequence of which, as well as its colour, it is an ingredient in *curry-powder*. It is not employed as a medicine, but is generally used as a testing agent for alkalies, which change its yellow colour to reddish-brown. For this purpose *Turmeric paper* is employed; it is prepared by soaking white *unsized* paper in a decoction (obtained by boiling 3j. of coarsely powdered turmeric in f3xij. of water, straining through a cloth and allowing the fluid to settle for a few minutes), and drying.

FERRI SULPHURETUM, D. E. *Sulphuret of Iron.*

PREPARATION.—*Dublin*.—"Take of rods of iron, of the size employed in the manufacture of nails, any convenient number: having raised them to a strong red or

white heat, apply them in succession by their heated extremities to sticks of sulphur, operating so that the melted sulphuret, as it is formed, may drop into a stone cistern filled with water, and be thus protected from oxidation. The water being poured off, let the product be separated from the sulphur with which it is mixed, and, when dried, let it be enclosed in a well-stopped bottle." *Edinburgh*.—"Iron filings, 3 parts; sublimed sulphur, 1 part; mix them thoroughly; heat the mixture in a covered crucible till it becomes red hot: remove the crucible from the fire and allow the action to go on without heat. A much purer sulphuret may be obtained by a process similar to that ordered by the Dublin college."

Sulphuret of iron is not used in medicine; it is employed in pharmacy, for the preparation of sulphuretted hydrogen gas.

LACMUS, L. E. *Litmus*; A prepared colouring matter from *Rocella tinctoria*, E. *The prepared Thallus of Rocella tinctoria*, L. (Also obtained from *Rocella fusiformis*, Lindley.) Natives of the Mediterranean and Channel islands; belonging to the Natural family *Lichenaceæ* (*Lichinales*, Lindley), and to the Linnæan class and order *Cryptogamia Alge*.

It is probable that these are not the only lichens employed in the preparation of litmus, but the plants used, as well as the exact process followed, is kept secret by the manufacturers. Sir Robert Kane, who has bestowed much attention on the subject, states that the lichens employed are ground with water to form a uniform pulp, and sufficient water added to make the whole into a thick fluid: ammoniacal liquors are from time to time mixed with this, the whole being exposed to the air and frequently agitated; when it has acquired the requisite shade of blue, chalk and plaster of Paris are added to the liquor so as to form a consistent paste, which when cut into little cubical masses and dried, forms the litmus of commerce.. It is not employed in medicine; in pharmacy it is used as a test for acids and alkalies, its colour being changed to red by the former, and the original blue tint again restored by the latter. *Litmus paper* is prepared in a similar manner to *Turmeric paper* (see above.)

LYCOPodium. *Vegetable brimstone*; A powder contained in the spore cases of *Lycopodium clavatum* and *Lycopodium selago*. These two species of club-moss belong to the Natural family *Lycopodiaceæ*.

Lycopodium is an extremely fine, very light powder, of a delicate yellow colour, inodorous and tasteless. It is exceedingly inflammable, burning like gunpowder, on which account it is used in the preparation of fireworks. It is commonly employed in France for rolling pills in, to facilitate their formation and to prevent them from adhering; and for this purpose it is far superior to liquorice powder or magnesia which are ordinarily used for the purpose in this country. Pills coated with lycopodium may be put into water without being injured.

MANGANESII PEROXYDUM, D. MANGANESII OXIDUM, E. MANGANESII BINOXYDUM, L. *Black oxide of Manganese; Peroxide of Manganese.* Found native in some parts of England and Scotland; it is known to mineralogists under the name of *Pyrolusite*.

It is only used as a pharmaceutical agent, at least in this country, being employed in the preparation of oxygen, chlorine, and iodine.

MARMOR, D. L. E. *White Marble.* Used in pharmacy for preparing quick lime, and for yielding carbonic acid gas, when added to hydrochloric acid.

OSSA, D. *Bones of the Ox or Bos taurus.*

Bones are an article of the Materia Medica in the Dublin Pharmacopœia; they are employed in the preparation of animal charcoal, the *Calcis phosphas præcipitatum*, and the *Sodæ phosphas* of the pharmacopœias.

PLUMBI CHLORIDUM, L. *Chloride of Lead.*

PREPARATION.—Acetate of lead, ℥xix. boiling distilled water, Oij.; chloride of sodium, ℥vj.; dissolve the acetate of lead and chloride of sodium separately; the former in the three pints of boiling distilled water, and the latter in one pint of distilled water. The liquors being then mixed together, wash what is precipitated with distilled water, when it is cold, and dry it.

This salt is employed by the London College in the preparation of the *hydrochlorate of morphia*. It is not used in medicine.

PLUMBI NITRAS, D. E. *Nitrate of Lead.*

PREPARATION.—*Dublin*.—"Take of litharge, in fine powder, five ounces; pure nitric acid, two fluid ounces; distilled water, three pints; dilute nitric acid, a sufficient quantity; to the litharge, placed in a porcelain dish, add the acid with a pint and a half of the water, and, applying a sand heat, and occasionally stirring the mixture, evaporate the whole to dryness. Upon the residue boil the remainder of the water, clear the solution by filtration, and, having acidulated it by the addition of a few drops of the dilute nitric acid, evaporate until a pellicle begins to form on the surface. The heat being now withdrawn, crystals will form on the cooling of the solution, which should be dried on blotting-paper in a warm atmosphere, and preserved in a close bottle." *Edinburgh*.—"Litharge, ℥ivss.; dilute nitric acid, Oj.; Dissolve the litharge to saturation with the aid of a gentle heat; filter and set the liquor aside to crystallize. Concentrate the residual liquor to obtain more crystals."

This salt is employed for the preparation of *iodide of lead*; and

by the Edinburgh College as a test for ascertaining the purity of *bitartrate of potash*, (see page 112); it is not used in medicine.

PLUMBI OXYDUM HYDRATUM, L. *Hydrated Oxide of Lead.*

PREPARATION.—Solution of diacetate of lead, Ovj.; distilled water, cong. iij.; solution of potash, Ovj., or as much as may be sufficient to precipitate the oxide; mix; wash with water what is precipitated until nothing alkaline remains.

It is employed by the London College in preparing the *disulphate of quina*; but it is not used in medicine.

PLUMBI OXYDUM RUBRUM, E. *Red-oxide of Lead; Minium.*

Red lead is employed by the Edinburgh College for purifying the strong acetic acid, (see page 136,) and for preparing *Aqua Chlorinei*. It is not used in medicine.

POTASSÆ BICHROMAS, D. *Bichromate of Potash.*

This salt is not used in medicine; it has been introduced into the last edition of the Dublin Pharmacopœia as being employed in the preparation of the *valerianate of soda*.

POTASSII FERROCYANIDUM, D. L. E. *Ferrocyanide of Potassium.*

This salt has been used by some physicians in America as a sedative, but the results obtained from it are very uncertain, and it would appear to be rather an inert substance. It has been introduced into the pharmacopœias as being a cheap material for preparing hydrocyanic acid, (see page 293).

PTEROCARPUS, L. E. *Red-sandal wood. Wood of Pterocarpus santalinus.* A native of Ceylon; belonging to the Natural family *Leguminosæ* (*Fabaceæ*, Lindley), and to the Linnæan class and order *Diadelphia Decandria*.

Red-sandal, or as it is often called, Red-saunders wood, is contained in the Pharmacopœias only as being employed as a colouring ingredient in the *compound spirit of Lavender*.

ROSA CENTIFOLIA, PETALA, D. L. E. *Petals of Rosa centifolia.*

ROSÆ OLEUM, D. E. *Attar or Otto of Roses; Volatile oil of the petals of Rosa centifolia.*

The hundred-leaved or Cabbage-rose, originally a native of Asia, is now cultivated freely in our gardens. It belongs to the Natural family *Rosaceæ*, and to the Linnæan class and order *Icosandria Polygynia*.

The pharmaceutical preparations of this rose are employed in medicine as perfumes, for giving an agreeable odour to mixtures, &c.; the volatile oil introduced into the last edition of the Dublin and Edinburgh Pharmacopœias is too expensive an article for general use. Laxative properties have been ascribed by some to the syrup, but they probably depend on the sugar which it contains.

PHARMACEUTICAL PREPARATIONS.—*Aqua Rosæ*, D. L. E. "Take of essential oil of roses, twenty minims; distilled water, half a gallon. Mix with agitation, and filter through paper," D.—"Petals of *rosa centifolia*, lbx.; proof (rectified, E.) spirit, f3vij. (f3ij., E.); water, cong. ij.; mix and distil a gallon," L. E. ["The petals should be preferred fresh; but it also answers well to use those which have been preserved by beating them with twice their weight of muriate of soda," E.] The formula of the Dublin College yields a milky product.—*Syrupus Rosæ*, L.—*Syrupus Rosæ centifoliæ*, E. (Petals of *rosa centifolia*, dried (fresh, E.), 3vij. (lbj. E.); boiling water, Oij.; pure sugar, lbvj. (lbij., E.); macerate (infuse, E.), the petals in the water for 12 hours and strain; [evaporate the strained liquor to Oij., in a water-bath, L.] and then add the sugar, and (with the aid of heat, E.) dissolve it). Syrup of roses is sometimes employed as a laxative for newly-born infants, in doses of f3ij. or f3ijj.

SAPO DURUS, D. E. SAPO, L. *Hard soap*, D.—(*Spanish or Castile*, E.) *soap made with olive oil and soda*, L. E.

SAPO MOLLIS, L. E. *Soft soap; soap made with olive oil and potash.*

Soaps are used in pharmacy as the bases of some cerates and plasters, and for making pill masses. By some they are believed to be slightly laxative.

SODÆ CAUSTICÆ LIQUOR, D. *Solution of Caustic Sodæ.*

PREPARATION.—Take of crystallized carbonate of soda of commerce, two pounds; fresh-burned lime, ten ounces; distilled water, one gallon and seven ounces. Slake the lime with seven ounces of the water. Dissolve the carbonate of soda in the remainder of the water, and having raised the solution to the boiling point in a clean iron vessel, gradually mix with it the slaked lime, and continue the ebullition for ten minutes with constant stirring. Remove the vessel now from the fire, and when by the subsidence of the insoluble matters, the supernatant liquor has become perfectly clear, transfer it by means of a syphon to a green-glass bottle, furnished with an air-tight stopper.

The specific gravity of this solution is 1056.

This solution is used in the preparation of the *valerianate of soda* of the last edition of the Dublin Pharmacopœia.

SODÆ PHOSPHATIS SOLUTIO, E. *Solution of Phosphate of Soda.*

PREPARATION.—Phosphate of soda, free of efflorescence, 175 grains; distilled water, fʒviiij.; dissolve the salt in the water and keep the solution in well closed bottles.

Phosphate of soda has been described in the division *Cathartics*; this solution is only employed as a test.

ZINCI CHLORIDI LIQUOR, D. *Solution of the Chloride of Zinc.*

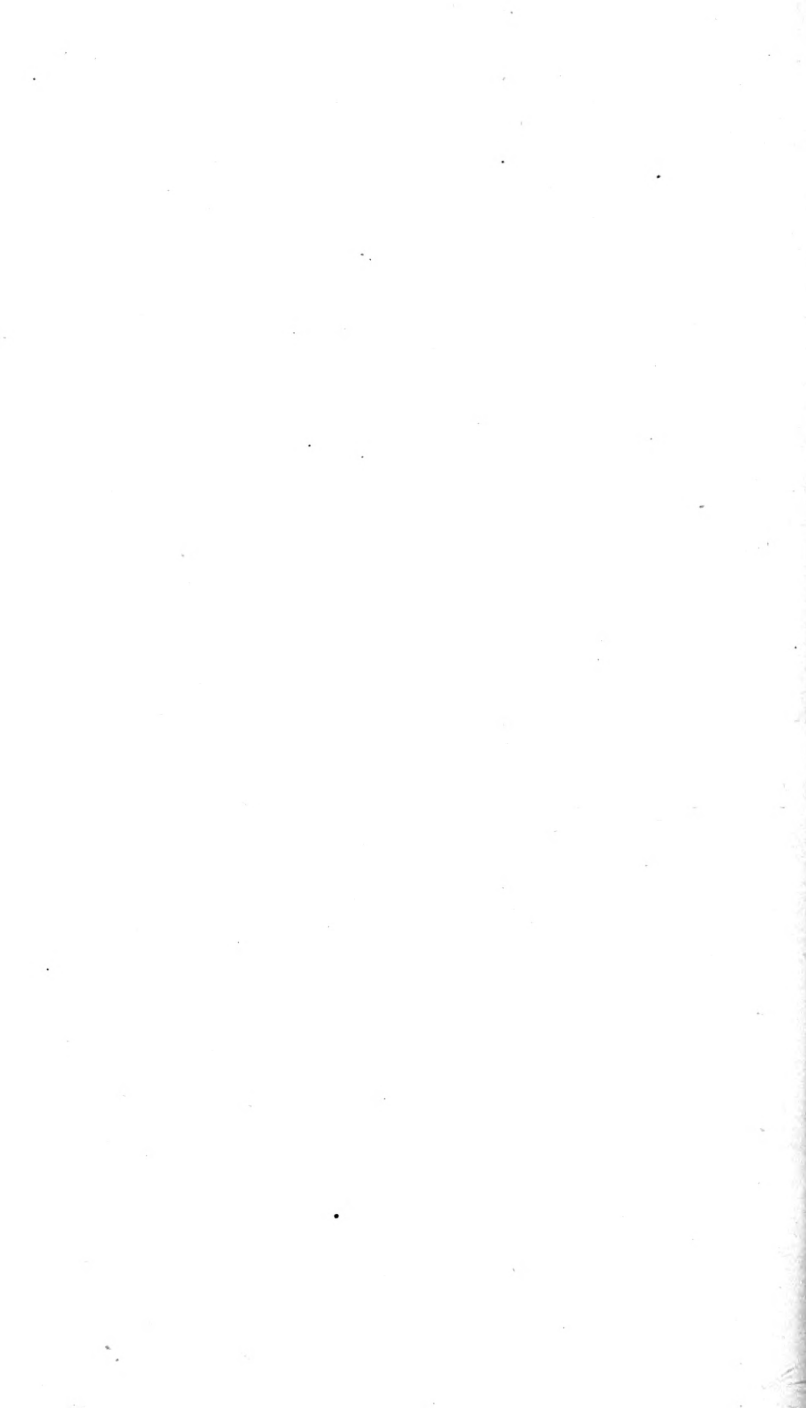
PREPARATION.—Take of sheet zinc, one pound: muriatic acid of commerce; water, of each, two pints and a half, or as much as may be sufficient; solution of chlorinated lime, one fluid ounce; prepared chalk one ounce. To the zinc, introduced into a porcelain capsule, gradually add the muriatic acid, applying heat until the metal is dissolved. Filter the liquid through calico, and, having added to it the solution of chlorinated lime, concentrate at a boiling temperature, until it occupies the bulk of one pint. Permit the solution now to cool down to the temperature of the air, place it in a bottle with the chalk, and, having first added distilled water, so that the bulk of the whole may be a quart, shake the mixture occasionally for twenty-four hours. Finally, filter, and preserve the product in a well-stopped bottle.

“The specific gravity of this liquor is 1593.

This solution has recently been very much employed as a deodorising agent, for which purpose it was first proposed by Sir William Burnett; its effects as such are most valuable. In pharmacy it is used for the preparation of the *chloride of zinc* of the last edition of the Dublin Pharmacopœia.

ZINCUM, D. L. E. *Zinc. Metallic Zinc.*

Zinc is employed in pharmacy for preparing the different compounds of the metal which are used as medicines. As met with in commerce it frequently contains many impurities, as carbon, iron, copper, arsenic, &c. The London and Edinburgh Colleges have therefore given the following tests, by which it may be ascertained if it is sufficiently pure for the above purpose:—“Almost entirely dissolved by dilute sulphuric acid, and the solution is colourless; what is thrown down from the solution by ammonia is white, and when the ammonia is added in excess, it is again dissolved. The specific gravity of the metal is 6·86,” L.—“It dissolves in a great measure in diluted sulphuric acid, leaving only a scanty grayish-black residuum. This solution presents the characters of the solution of sulphate of zinc,” E.



APPENDIX A.

FORMULÆ.

ANTACIDS.

R Aquæ Ammoniaë, min. x. ; Infusi Chiretæ, f3j. ; Tincturæ Aurantii, f3ij. M. Fiat haustus, mane meridiæque sumendus. (A useful antacid draught in the dyspepsia of the debilitated, attended with acid eructations.)

R Ammoniaë Bicarbonatis, gr. viij. ; Infusi Calumbæ, f3j. ; Tincturæ Lupuli (L.), f3j. ; Tincturæ Hyoseyami, min. xx. M. Fiat haustus, bis quotidie sumendus. (Less stimulating than the former, and better adapted for cases in which the stomach is irritable.)

R Ammoniaë Sesqui-carbonatis, gr. xxiv. ; Fellis Bovini Inspissati, 3ss. ; Mucilaginis, q. s. M. Fiant pilulæ duodecim ; Capiat unam ter in die. (In dyspepsia accompanied by vomiting of food and constipation.)

R Aquæ Ammoniaë Carbonatis, f3ss. ; Infusi Cascarillæ, f3vij. ; Spiritus Ætherci Nitrosi, f3j. ; Spiritus Cinnamomi, f3iij. M. Fiat mistura, de quâ sumantur cochlearia ij. ampla ter in die. (In the lithic acid diathesis, with debility of the digestive organs.)

R Aquæ Calcis, f3iv. ; Confectionis Aromaticæ, 3ij. ; Tere simul et gradatim adde, Misturæ Amygdalarum, f3iiiss. ; Aquæ Lauro-cerasi, f3j. M. Fiat mistura ; Capiat cochlearia ij. ampla bis terve in die, phialâ priûs concussâ. (Useful in cardialgia and in gastrodynia.)

R Aquæ Calcis Effervescentis (*Carrara water*, page 8) ; Lactis Recentis, ana, f3ij. ; fiat haustus, ter quaterve in die sumendus. (In dyspepsia, with much irritability of the stomach, and cardialgia.)

R Misturæ Cretæ, f3vj. ; Tincturæ Lupulinæ, f3j. ; Tincturæ Cardamomi Compositæ, f3vij. ; Vini Opii, f3j. M. Capiat seminuiciam sextis horis. (In diarrhœa dependant on acidity of the *primæ viæ*.)

R Pulveris Cretæ compositi, gr. xvij. ; Carbonatis Sodæ siccati, gr. vj. ; Pulveris Tragacanthæ, gr. xij. M. Divide in partes sex æquales, quarum capiat unam quâque secundâ vel tertiâ horâ. (In the diarrhœa of children.)

R Aquæ Magnesiæ Bicarbonatis, f3ss. ; Tincturæ Lavandulæ compositæ, f3j. M. Fiat haustus,umat statim et repetatur semihorio si opus sit. (An excellent remedy in heartburn.)

R Solutionis Alkalinæ (*Brandish*), f3v. ; Infusi Chiretæ, f3x. ; Essentiæ Anisi, f3ij. ; Syrupi Aurantii, f3j. M. Fiat mistura ; Capiat cochlearia ij. magna ter in die. (In the lithic acid diathesis.)

R Liquoris Potassæ effervescentis, f3iv. ; Tincturæ Chiretæ ; Tincturæ Lupulinæ, ʒ ʒ, f3ss. ; Fiat haustus, ex effervescentiâ sumendus, et repetatur ter in die. (An excellent antacid draught in dyspepsia with deposit of lithates in the urine. This draught is best prepared by putting the tinctures mixt together into a tumbler, and pouring the effervescing potash water on them ; it should be swallowed immediately.)

R Liquoris Potassæ effervescentis, f3ij. ; Vini Seminum Colechici, min. xx. ; Tincturæ Cardamomi compositæ, f3ss. Fiat haustus ter in die sumendus. (In dyspeptic affections occurring in gouty habits : see observations on last prescription, for preparation.)

R Sodæ Bicarbonatis, gr. x. ; Infusi Calumbæ, f3iss. ; Aquæ Lauro-cerasi, min. xij. ; Creasoti, min. j. M. Fiat haustus sextis horis sumendus, et ad tertiam vel quartem vicem repetendus si opus sit. (In acidity of the stomach with vomiting.)

R Sodæ Carbonatis siccati, 3ss. ; Pulveris Myrrhæ, gr. xvij. ; Pulveris Ipecacuanhæ, gr. iij. M. Divide in chartulas vj. quarum unamumat quartâ quâque horâ. (An excellent antacid in chronic diarrhœa and dysentery.)

ANTHELMINTICS.

R Syrupi Allii sativi, (page 22), f3j. ; Olei Terebinthinæ, f3ss. ; Decocti Hordei, f3vij. M. Fiat enema, injiciatur statim, et horæ unius spatio adhibeatur enema catharticum. (For ascarides in the rectum ; Half or a fourth part of the above may be used for children.)

R Pulveris Absinthii, gr. xxx. ; Calomelanos, gr. vj. ; Muriatis Sodæ, gr. xij. ; Saponis Jalapini, (page 104), gr. xxiv. ; Mellis Despumat, q. s. M. Divide in bolos ij. ; Sumat unum mane, et alterum post horas sex, nisi prius benè dejecerit alvus. (In cases of lumbrici or ascarides.)

R Infusi Absinthii, f3ij. ; Infusi Gigartinæ, (page 23), f3iss. ; Tincturæ Valerianæ; Syrupi Zingiberis, ʒ ʒ, f3ij. M. Fiat mistura, Capiat partem tertiam trihorio. (For expelling lumbrici.)

R Olei Filicis-maris, (page 22), min. xxx. ; Misturæ Amygdalæ, f3ij. M. Fiat emulsio, et divide in partes æquales ij., quarum sumatur una horâ somni, et altera mane sequente. (A most efficacious anthelmintic for the *tape worm*. If it do not purge, an active cathartic should be given in four hours after the second dose.)

R Mucunæ, ʒss. ; Pulveris Spigeliæ, gr. xij. ; Syrupi, f3ss. ; in mortario terendo misce intimè. (An excellent anthelmintic in cases of lumbrici; the above quantity should be administered for three successive mornings before breakfast, and the third dose followed by an active mercurial purge.)

R Granati radicis corticis, ʒij. ; Pulveris Sabadillæ, gr. vj. ; Pulveris Aromatici, ʒss. M. Divide in pulveres sex, Capiat unum omni semihorâ ad sextam vicem. (In cases of tænia ; the last dose should be followed by an active saline purge.)

R Pulveris Spigeliæ, gr. x. ; Pulveris Stanni, ʒij. ; Syrupi Zingiberis, f3ss. ; Mellis, q. s. M. Fiat Bolus, horâ ante jentaculum sumendus, et per dies tres repetendus ; postea abhibeatur mistura purgans ad plenam alvi solutionem. (In cases of lumbrici.)

R Infusi Spigeliæ, f3j. ; Infusii Allii, f3j. ; Confectionis Terebinthinæ, ʒij. ; Fiat baustus. (An effectual anthelmintic in cases of lumbrici.)

ANTISPASMODICS.

R Tincturæ Fuliginis, f3ss. ; Misturæ Camphoræ cum Magnesiâ, f3viss. ; Syrupi Aurantii, f3j. M. Fiat mistura, Capiat unciam omni horâ donec abierit spasmus. (In the hysteria of females.)

R Spiritus Fuliginis, f3ss. ; Aquæ Sodæ carbonatis, f3ij. ; Syrupi Aurantii, f3iss. ; Aqua Menthæ pulegii, f3iss. M. Fiat mistura, sumat cochleare medium tertiis vel quartis horis. (In the advanced stages of whooping-cough in children ; a tea-spoonful for infants.)

R Extracti Fuliginis, gr. xxx. ; Pilulæ Assafoetidæ compositæ, ʒj. ; Olei Valerianæ, min. x. ; M. Divide in pilulas duodecim, quarum capiat duas ter in die. (In hysterical neuralgia in females.)

R Tincturæ Assafœtidæ, f3j. ; Spiritus Ammoniac aromatici, f3ss. ; Misturæ Moschi, f3j. ; Misturæ Camphoræ cum Magnesiâ, f3viss. M. Fiat haustus. (A useful antispasmodic in hysteria and spasmodic colic.)

R Tincturæ Castorei compositæ, f3v. ; Spiritus Etherei Oleosi, f3ij. ; Misturæ Moschi, f3vij. M. Fiat mistura, de quâ sumatur cochleare unum magnum secundis horis, donec evanescant symptomata. (In cramp of the stomach, in spasmodic or flatulent colic, in hysteria, in hiccup, in nervous palpitations, &c.)

R Pilulæ Sagapeni compositæ, gr. xl. ; Olei Rutæ, min. xv. ; fiant pilulæ duodecim. Capiat duas vel tres pro dosi. (In the flatulent colic of hysteria.)

R Zinci Valerianatis, gr. viij. ; Tincturæ Valerianæ, f3ij. ; Aquæ Florum Aurantii, f3iiiss. ; Syrupi Hemidesmi, f3ij. ; fiat mistura cujus capiat semiunciam sextis horis. (An excellent mixture in hysteria, chorea and other nervous affections.)

R Valerianatis Quinæ, gr. ix. ; Extracti Gentianæ, gr. xxiv. ; fiant pilulæ duodecim, quarum capiat unam ter in die. (In nervous debility, hysteria, &c.)

ASTRINGENTS.

R Aceti Destillati, f3ij. ; Aquæ Lauro-cerasi, f3ij. ; Syrupi Rhæados, f3vj. ; Aquæ destillatæ, f3v. M. Fiat mistura, cujus capiat cochlearia duo ampla sextis horis. (An excellent sedative astringent in chronic mucous or purulent discharges, attended with much debility and irritability of the stomach.)

R Acidi Gallici, gr. xx. ; Mucilaginis Acaciæ, f3ij. ; Aquæ destillatæ, f3iiiss. ; Syrupi Rhæados, f3ij. ; M. Fiat mistura, de quâ sumatur uncia secundis vel tertiis horis. (In hemorrhage from the kidneys or bladder.)

R Acidi Sulphurici aromatici, f3iiiss. ; Syrupi Rosæ Gallicæ, f3vss. ; Aquæ destillatæ, f3vij. M. Fiat mistura, sumat unciam sextis horis. (A useful astringent mixture in passive hemorrhages, and in the colliquative sweating of hectic.)

R Tincturæ Cinnamomi compositæ, f3ij. ; Acidi Sulphurici diluti, f3ij. Fiat mistura, cujus capiat guttas xx. ter in die, ex cyatho Decocti Hordei. (In the same cases as the above mixture.)

R Aluminis, 3iss. ; Syrupi Rosæ Gallicæ, f3j. Aquæ Rosæ, f3vij. M. Fiat mistura cujus sumat cochleare amplum tertiis vel quartis horis. (In old cases of diarrhœa, and in painter's colic.)

R Infusi Rosæ acidi; Misturæ Althææ, ana, f3iij.; Aluminis, f3j.; Mellis Rosæ, f3ij. M. Fiat gargarisma, sæpè utenda. (A useful gargle in relaxed sore throat, and in chronic ulcerations of the mouth and fauces.)

R Creasoti, min. j.; Spiritus Juniperi compositi, min. xx.; Aquæ destillatæ, f3j. M. Fiat haustus, secundis vel tertiis horis sumendus. (In chronic diarrhœa with vomiting.)

R Creasoti, min. iv.; Tincturæ Gallæ, f3ij.; Aquæ destillatæ, f3ij.; M. Fiat lotio. (In indolent ulcers with excessive discharge.)

R Sulphatis Ferri; Carbonatis Potassæ, ana, 3ss.; Mucilaginis Gummi Tragacanthæ, q. s. Fiat massula et divide in pilulas xij.; Capiat unam ter in die. (An excellent remedy in leucorrhœa.)

R Ferri Pernitratis Liquoris, f3iij.; Syrupi Simplicis, f3v.; Aquæ destillatæ, f3iij. M. Capiat cochleare amplum sextis horis. (A very useful astringent and tonic mixture in chronic mucous diarrhœa, and in leucorrhœa.)

R Sulphatis Cupri, gr. vj.; Pulveris Myrrhæ, gr. xij.; Confectionis Rosæ, gr. xl. M. Divide in pilulas xij., Sumat unam sextis horis. (In chronic diarrhœa and dysentery.)

R Tincturæ Gallæ, f3j.; Misturæ Amygdalæ, f3iss.; Mucilaginis, f3ss.; Aquæ, f3v. M. Capiat cochleare amplum post singulas liquidas dejectiones. (An excellent astringent mixture in colliquative diarrhœa.)

R Pulveris Kino compositi, gr. x.; Pulveris Cretæ compositi, gr. xv.; Syrupi Zingiberis, q. s. M. Fiat Bolus, sextâ quâque horâ sumendus. (In diarrhœa occurring in the old and debilitated.)

R Decocti Hæmatoxyli, f3viss.; Tincturæ Monesiæ, f3j.; Syrupi Aurantii, f3ss. Fiat mistura, ejus capiat cochleare amplum post singulas liquidas dejectiones. (In chronic diarrhœa and dysentery.)

R Monesiæ, gr. lx.; Aluminis, gr. xxiv.; Confectionis Aromaticæ, gr. xxx.; Syrupi, q. s. ut fiant pilulæ xxiv.; Sumat ij. ter in die. (In leucorrhœa, in chronic diarrhœa, and in pyrosis.)

R Tincturæ Matico, f3vj.; Infusi Krameriæ, f3vij.; Syrupi Croci, f3ij. M. Fiat mistura ejus capiat semunciam tertiis vel quartis horis. (In chronic mucous diarrhœa, or in the diarrhœa of phthisis.)

R Plumbi Acetatis; Digitalis, ana, gr. vj.; Opii, in pulvere, gr. iij.; Confectionis Rosæ, gr. xij. M. Divide in pilulas sex, e quibus una ter in die sumatur. (In active hemorrhages.)

R Plumbi Acetatis, gr. ix.; Pilulæ Saponis compositæ, gr. v. M. Divide in pilulas tres, quarum capiat unam tertiis vel quartis horis. (An excellent remedy in the autumnal cholera of this country.)

R Decocti Tormentillæ, f3vj.; Decocti Papaveris, f3ij.; Acidi Tannici, gr. xviii. M. Fiat liquor, cujus quantum satis sit quater de die, ope siphunculi eburnei, in vaginam injiciatur. (In chronic leucorrhœa.)

R Acidi Tannici, gr. xij.; Confectionis Rosæ, gr. xxxij. M. Divide in pilulas xij. e quibus sumatur una quartis horis. (An excellent astringent in the colliquative sweating and diarrhœa of phthisis.)

R Decocti Granati, f3vj.; Mellis Boracis, f3j. M. Sit gargarisma sæpè utendum. (In aphthous ulcerations of the mouth and fauces.)

R Sulphatis Zinci, ʒj.; Aquæ destillatæ, f3iv.; Tincturæ Croci, f3ij. M. Fiat collyrium, sæpè utat. (A useful eye-wash in chronic ophthalmia.)

R Pulveris Uvæ-ursi, ʒiij.; Acidi Tannici, gr. vj.; Pulveris Opii, gr. ij. M. Divide in portiones duodecim æquales; Capiat unam ter in die. (In passive hæmaturia, in albuminuria, and in chronic catarrh of the bladder.)

R Sulphatis Zinci, gr. xxiv.; Ipecacuanhæ, gr. iv.; Pulveris Myrrhæ, gr. xxiv.; Lactucarii; Confectionis Rosæ, ana, ʒss. M. Divide in pilulas xxiv. e quibus sumatur una sextâ quâque horâ. (In chronic diarrhœa and dysentery.)

R Calcis Chlorinatæ, ʒiv.; Aquæ destillatæ, f3xj.; Solve et cola, dein adde, Syrupi Florum Aurantii, f3j. M. Fiat liquor, quo gingivas sæpè gargarizet. (A most efficacious gargle in excessive salivation.)

R Tincturæ Acetatis Zinci, f3ij.; Infusi Matico, f3viiss.; Mucilaginis Gummi Tragacanthæ, f3ij.; M. Fiat injectio, frequenter utenda. (An excellent injection in the advanced stages of gonorrhœa, in gleet, and in leucorrhœa.)

CATHARTICS.

R Decocti Aloës compositi, f3iij.; Syrupi Croci, f3ss.; Syrupi Rhei, f3ss. M. Fiat mistura duabus vicibus sumenda. (In torpidity of the bowels, and in chlorosis.)

℞ Calomelanos, gr. xxx. ; Saponis Crotonis, gr. vj. ; Pilulæ Colocynthis et Hyoscyami, gr. xxiv. M. Divide in pilulas xij. e quibus sumatur una ter de die. (In spasmodic and nervous diseases.)

℞ Pilulæ Colocynthis compositæ; Saponis Jalapinæ, ana, gr. lx. M. Fiat massula et divide in pilulas xxiv. e quibus sumantur duæ, prout res poscit. (A good formula for purgative pills for general use.)

℞ Pilulæ Cambogiæ compositæ, gr. xl. ; Pilulæ Hydrargyri, gr. xx. M. Divide in pilulas xij. ; Capiat ij. pro re natâ. (In constipation with deficient secretion of bile.)

℞ Extracti Colchici acetici, gr. xij. ; Pilulæ Hydrargyri, gr. xxx. : Extracti Hyoscyami, gr. xvij. M. Fiant pilulæ duodecim, e quibus sumantur duæ tertiâ quâque nocte. (An excellent cathartic in gouty and rheumatic habits, the following draught being administered the next morning.)

℞ Succi Colchici, min. x. ; Magnesiæ Carbonatis, gr. xij. ; Tincturæ Cinnamomi compositæ, f3ss. ; Aquæ Cinnamomi, f3iss. M. Fiat haustus. (To be given in the morning, two of the above pills having been taken the previous evening.)

℞ Vini Seminum Colchici, f3ss. ; Tincturæ Rhei et Aloës, f3j. ; Spiritus Myristicæ, f3ss. ; Infusum Rhei, f3vj. ; M. Fiat mistura, de qua sumantur cochlearia ampla ij., tertiis vel quartis horis ad effectum. (A useful cathartic in gouty and rheumatic habits.)

℞ Tincturæ Colocynthis, min. xx. ; Infusi Sennæ compositi, f3ij. ; Tincturæ Cardamomi compositæ, f3ss. M. Fiat haustus, bis quotidie sumendus. (In dropsical cases.)

℞ Tincturæ Elaterii, f3j. ; Syrupi Sennæ, f3ss. ; Syrupi Zingiberis, f3j. ; Aquæ Menthæ Piperitæ, f3j. M. Fiat haustus, quamprimum sumendus, et, nisi alvus sit intereà copiosè soluta, quadrihorio repetatur. (In ascites occurring in the robust, provided no inflammatory tendency be present.)

℞ Olei Ricini, f3vj. ; Mucilaginis Gummi Arabici, f3ij. ; Tere optimè simul, hisque inter terendum paulatim adjice, Syrupi Croci, f3j. ; Aquæ destillatæ, f3iss. Fiat haustus. (A safe and efficacious purgative draught.)

℞ Saponis Crotonis, gr. ss. ; Extracti Hyoscyami ; Pilulæ Hydrargyri, ana gr. iv. ; Olei Pimentæ, min. ij. M. Divide in pilulas ij. horâ somni sumat.

℞ Tincturæ Hellebori, f3iss. ; Infusi Sennæ compositi, f3j. ; Syrupi Zingiberis, f3ij. M. Fiat haustus, primo mane sumendus. (The above pills and draught will be found very useful in cephalalgia dependant on congestion of the vessels of the head, and accompanied by a torpid state of the bowels ; also in mania.)

R Hydrargyri cum Cretâ, gr. xij. ; Pulveris Scammonii, gr. xij. ; Carbonatis Sodæ siccati, gr. vj. ; Pulveris Aromatici, gr. xij. M. Divide in portionibus paribus vj., e quibus sumatur una omni mane. (An excellent alterative and cathartic for children ; very useful in worm cases.)

R Lini Cathartici, herbæ recentis, ʒij. ; Aquæ ferventis, fʒij. ; Digere per horas duas in vase clauso, cola et adde, Tincturæ Cardamomi compositæ, fʒj. Fiat haustus. (In simple constipation.)

R Resinæ Jalapæ, gr. v. ; Confectionis Amygdalarum, gr. xxx. ; Simul terantur, hisque inter terendum adde, Aquæ destillatæ, fʒiss. M. Fiat haustus, illicò sumendus. (An excellent cathartic in simple constipation.)

R Sulphatis Magnesiæ, ʒvj. ; Infusi Rosæ acidæ, fʒij. M. Fiat haustus. (An excellent purgative draught in mild febrile and inflammatory affections, accompanied by constipation.)

R Manganesiæ Sulphatis, ʒiv. ; Vini Seminum Colchici, min. xxx. ; Aquæ Rosæ, fʒiv. M. Fiat haustus. (A useful purgative draught in gouty or rheumatic habits.)

R Manganesiæ Sulphatis, ʒiv. ; Acidi Sulphurici diluti, min. viij. ; Infusi Sennæ compositi, fʒij. M. Fiat haustus. (An excellent purgative draught in dyspeptic affections with deficient secretion of bile.)

R Mannitæ, gr. xxx. ; Aquæ Menthæ piperitæ, fʒss. Solve ; Fiat haustus. (An excellent laxative for children.)

R Potassæ Sulphatis, ʒss. ; Acidi Sulphurici diluti, min. v. ; Aquæ Rosæ, fʒij. M. Fiat haustus. (In mild febrile and inflammatory affections.)

R Potassæ Bitartratis, ʒiv. ; Acidi Boracici, ʒj. ; Aquæ destillatæ, fʒxij. Fiat mistura, pars quarta cujus tertiâ quâque horâ ad plenam alvi solutionem sumatur. (In dropsical effusions, more especially into the abdomen.)

R Potassæ Bitartratis, ʒss. ; Pulveris Jalapæ, gr. xxx. ; Confectionis Sennæ, ʒiss. ; Extracti Sennæ fluidi, fʒss. M. Fiat electuarium, de quo sumatur instar nucis moschatæ, ter quotidie, vel donec alvus commodè purgetur. (In hemorrhoidal affections.)

R Infusi Sennæ compositi, fʒiss. ; Syrupi Rhei, fʒij. ; Spiritus Nucis Moschatæ, fʒss. M. Fiat mistura, de quâ sumantur cochlearia ij. ampla secundis horis donec alvus leniter dejecerit. (In simple constipation of the old or debilitated.)

℞ Extracti Sennæ fluidi ; Vini Rhei, ʒ ʒ, fʒij. ; Aquæ Cinnamomi, fʒiss. M. Fiat haustus. (A purgative draught, suited for cold leucophlegmatic habits.)

℞ Mellis Violæ ; Mannæ, ana, ʒss. ; Syrupi Violæ, q. s. Fiat electuarium, ejus capiat cochleare parvulum pro re natâ. (A mild laxative readily taken by children.)

℞ Resinæ Scammonii, gr. v. ; Confectionis Amygdalarum, gr. xxx. ; Simul terantur, hisque inter terendum adde, Aquæ destillatæ, fʒiss. M. Fiat haustus. (An excellent cathartic in simple constipation. The dose for children is one-third, or one-half of the above.)

℞ Pulveris Scammonii, gr. xxx. ; Pulveris Jalapæ, gr. lx. ; Syrupi Aurantii, et Mucilaginis, ana, q. s. ut fiant pilulæ xxiv. e quibus sumantur duæ alternis horis, vel donec bis dejecerit alvus. (In the constipation of lead colic.)

℞ Resinæ Jalapæ ; Calomelanos ; Saponis Hispanici, ana, gr. xv. ; Olei Caryophylli, min. vj. M. Divide in pilulas xij. e quibus sumatur una semihorio ad plenam alvi solutionem. (In obstinate constipation.)

℞ Sodæ Hyposulphitis, ʒij. ; Aquæ Menthæ piperitæ, fʒxiv. ; Tincturæ Cardamomi compositæ, fʒij. M. Fiat haustus. (An active cathartic draught in the constipation of atonic dyspepsia.)

℞ Sodæ Sulphatis, ʒv. ; Infusi Rosæ acidæ, fʒiss. ; Acidæ Sulphuricæ diluti, min. ij. M. Fiat haustus. (A useful antiphlogistic cathartic.)

℞ Sodæ Phosphatis, ʒiv. ; Aquæ Menthæ Piperitæ, fʒij. ; Solve, dein adde, Extracti Sennæ fluidi, fʒss. Fiat mistura, de quâ capiat cochleare amplum secundis horis donec alvus commodè moveatur. (A useful purgative mixture.)

℞ Olei Terebinthinæ ; Olei Ricini, ana, fʒij. ; Decocti Hordei, fʒvj. M. Fiat enema. (The best purgative in *purpura hæmorrhagica* occurring in children ; it may be administered twice daily until the spots begin to fade.)

CAUSTICS.

℞ Chloridi Zinci, ʒss. ; Antimonii Terchloridi Liquoris, min. xv. ; Farinæ, ʒj. ; Aquæ destillatæ, q. s. Fiat massa, quâ pars morbida exedatur. (An excellent caustic paste in cancer, and lupus.)

℞ Chloridi Zinci, ʒss. ; Farinæ, ʒj. *vel*, ʒij. *vel*, ʒij. M. Fiat massa. (The above proportions of flour may be used according to the strength the caustic paste is wished to be ; it is employed in the same cases as the former.)

R Arsenici Albi, partes vj. ; Calomelanos, partes xcvj. M. Fiat pulvis. DUPUYTREN.
(Sprinkled on lint, and applied in small portions at a time to open cancer ; the practice is not unattended with danger.)

R Hydrargyri Pernitratis Liquoris, f3ij. ; Pulveris Tragacanthæ, quantum sufficit ut fiat massa. (A caustic paste for cancer or lupus.)

R Hydrargyri Oxydi rubri ; Aluminis siccati, ana, 3j. M. Fiat pulvis. (Sprinkled on the parts to repress exuberant and spongy granulations.)

R Hydrargyri Oxydi rubri ; Amyli, ana, 3ss. ; Sacchari Puri, 3j. Misce bendè terendo simul, ut fiat pulvis subtilissimus. (In thickening of the cornea, to be blown into the eye three or four times a day.)

R Carbonatis Cupri, 3ij. ; Adipis preparati, 3j. M. Fiat unguentum. DEVERGIE.
(In the chronic forms of eczema and impetigo of the scalp, where stimulating applications are admissible.)

DIAPHORETICS.

R Antimonii Oxydi, gr. xc. ; Muriatis Morphicæ, gr. iss. ; Confectionis Rosæ, q. s. Fiant pilulæ xxiv. e quibus sumantur duæ, tertiis horis. (In chronic cutaneous diseases, and in chronic rheumatism.)

R Pulveris Antimonialis, gr. iij. ; Calomelanos, gr. ss. ; Extracti Hyoscyami, gr. iss. M. Fiat pilula, sumenda quâque tertiâ horâ. (In acute rheumatism, and in mild febrile affections with a harsh dry skin.)

R Antimonii Tartarizati, gr. ij. ; Decocti Dulcamaræ, f3viiss. ; Syrupi Hemidesmi, f3ss. M. Fiat mistura, de quâ capiat cochleare amplum secundis horis. (An excellent diaphoretic mixture in febrile and inflammatory affections.)

R Tinctura Guaiaci Ammoniata, f3ij. ; Mucilaginis Gummi tragacanthæ, f3vj. ; Tere simul, et paulatim adjice, Misturæ Amygdalæ, f3ij. Fiat mistura, sumenda in die partitis vicibus. (In atonic gout, in chronic rheumatism, and in chronic cutaneous diseases.)

R Sarsaparillæ radicis, incisæ, 3iss. ; Aquæ destillatæ ferventis, Oj. Macera per horas duodecim in vase clauso, subinde agitans, dein cola.

R Hujus infusi, f3x. ; Infusi Sassafras ; Decocti Mezerei, ana, f3iss. ; Syrupi Hemidesmi, f3j. M. Fiat Mistura, de quâ sumatur cyathum vinarium ter quaterve in die. (In secondary syphilitic affections, particularly the forms of cutaneous disease.)

℞ Resinæ Guaiaci, gr. xij. ; Olei Sassafras, min. v. ; Theriacæ, quantum sufficit ut fiat bolus, ter quaterve in die sumendus. (In chronic rheumatic affections, more especially if of syphilitic origin.)

DIURETICS.

℞ Decocti Pyrolæ, f℥vij. ; Nitratis Potassæ, gr. xxx. ; Spiritus Ætherici Nitrosi, f℥ss. ; Spiritus Juniperi compositi, f℥ij. M. Fiat mistura ; Capiat cochleare amplum quâque tertiâ horâ. (A stimulating diuretic in old cases of dropsy.)

℞ Tincturæ Buchu, f℥ss. ; Decocti Uvæ Ursi, f℥viiss. M. Fiat mistura, ejus capiat unciam quater in die. (In chronic catarrh of the bladder, and in chronic mucous discharges from the vagina or urethra.)

℞ Extracti Pareiræ, gr. lx. ; Carbonatis Sodæ siccati, gr. xij. ; Extracti Conii, gr. vj. ; Syrupi Papaveris, q. s. ut fiant pilulæ xxiv. ; Capiat ij. sextâ quâque horâ. (In calculous affections, and in chronic catarrh of the bladder.)

℞ Bitartratis Potassæ, ℥ss. ; Ureæ, ℥ij. ; Mellis, ℥ss. M. Fiat electuarium, de quo capiat instar nucis moschatæ, ter quotidie. (In anasarca or ascites, with deficient secretion of urine.)

℞ Pulveris Scillæ, gr. xxx. ; Potassæ Acetatis, ℥ss. ; Aceti Scillæ, f℥ij. ; Mellis, ℥j. ; Olei Juniperi, min. xx. M. Fiat electuarium, de quo capiat instar nucis moschatæ sextis horis. (In old cases of anasarca.)

℞ Amygdalarum Dulcium decorticatarum, ℥j. ; Cantharidum, in pulvere subtilo, gr. x. ; Sacchari Puri, ℥ss. ; Tere benè simul, et gradatim adjice, Aquæ tepidæ, f℥x. Cola. Liquoris colatæ capiat cochleare amplum tertiis horis. (In torpor of the kidneys, and in incontinence of urine caused by paralysis of the neck of the bladder.)

℞ Boracis, gr. xxx. ; Decocti Pareiræ, f℥xij. M. Fiat mistura, de quâ sumatur cyathum vinarium sextis horis. (In chronic mucous discharges from the bladder with excess of uric acid.)

℞ Tincturæ Buchu ; Tincturæ Matico, ana, f℥ss. ; Decocti Pareiræ ; Decocti Uvæ Ursi, ana, f℥viiss. M. Fiat mistura, ejus capiat cochlearia duo ampla sextis horis. (In chronic catarrh of the bladder in old persons.)

℞ Olei Terebinthinæ, f℥j. ; Gummi Tragacanthæ, ℥ss. ; Syrupi Aurantii, f℥j. ; Tere benè simul, et gradatim adjice, Aquæ Menthæ Piperitæ, f℥vj. ; Spiritus Ætherici Nitrosi, f℥ij. M. Capiat cochleare amplum, quâque secundâ horâ. (A stimulating diuretic.)

EMETICS.

R Ammoniae Sesquicarbonatis, gr. xxx.; Infusi Senegæ, f3j.; Syrupi Croci, f3ij.
M. Fiat haustus statim sumendus. (In the suffocative catarrh of typhus.)

R Emetinæ Impuræ, gr. ij.; Syrupi Aurantii florum, f3j.; Aquæ destillatæ, f3ij.
M. Capiat cochleare amplum semihorio, donec supervenerit vomitio. (A certain emetic, applicable to the same cases as Ipecacuanha.)

R Violæ odoratæ radices, 3ss.; Syrupi Scillæ, f3j. M. Fiat Bolus statim sumendus, et post horam repetendus si opus sit. (An excellent substitute for Ipecacuanha.)

R Sinapis, 3j.; Aquæ tepidæ, f3xij. M. Fiat mistura statim sumenda. (An excellent stimulating emetic, particularly useful when the vital powers are sinking.)

EMMENAGOGUES.

R Ergotinæ, gr. xij.; Syrupi Croci, f3ss.; Aquæ Menthæ piperitæ, f3iiiss. M. Fiat mistura ejus capiat cochlearia ampla duo quartâ parte horæ ad effectum. (To accelerate delivery.)

R Tincturæ Ergotæ, f3iss.; Syrupi Croci, f3ij.; Decocti Aloës compositi, f3vj.
M. Fiat mistura, ejus capiat cochlearia ampla ij. sextis horis. (In amenorrhœa, with torpor of the circulation.)

R Tincturæ Ergotæ Æthereæ, f3j.; Infusi Sabinæ, f3iiiss.; Syrupi Croci, f3ss.
M. Fiat mistura, de quâ sumatur cochleare magnum ter in die. (In chlorotic amenorrhœa after the use of ferruginous preparations for some time.)

R Sulphatis Ferri siccati, gr. xx.; Pilulæ Aloës cum Myrrhâ, gr. lx.; Olei Rutæ, min. vj. M. Fiat massula et divide in pilulas xxiv. e quibus sumantur ij. bis quotidie. (Useful in chlorosis.)

R Ergotæ, gr. xlvij.; Theriacæ, q. s.; Olei Sabinæ, min. xij. M. Fiat electuarium ejus capiat sextam partem ter de die. (In simple atony of the uterine organs.)

EMOLLIENTS.

R Olei Olivæ, f3ij; Vitelli Ovi unius; Syrupi Althææ, f3j.; Decocti Lini compositi, f3ij. Fiat mistura secundum artem; capiat æger cochleare amplum subindè. (In inflammatory affections of the kidneys, in ardor urinæ, and as a general demulcent.)

℞ Decocti Hordei compositi, f℥x. ; Syrupi Hemidesmi, f℥ij. M. Fiat mistura ejus sumantur cochlearia ampla duo interdum. (An agreeable demulcent and excellent mixture, useful in inflammations of the mucous membranes.)

℞ Decocti Tussilaginis ; Misturæ Amygdalæ, ana, f℥ij. ; Syrupi Hemidesmi, f℥ij. M. Fiat mistura, de quâ capiat cochlearia ampla duo horis intermediis. (A useful demulcent mixture in chronic bronchitis.)

℞ Decocti Althææ, f℥vj. ; Decocti Glycyrrhizæ, f℥j. ; Tincturæ Opii camphoratæ, f℥ij. ; Syrupi Hemidesmi, f℥j. M. Fiat mistura, capiat cochleare amplum tussi urgenti. (In the troublesome cough of phthisis, and of chronic bronchitis.)

℞ Camphoræ, rasæ et redactæ, gr. x. ; Glycerinæ, f℥j. ; Unguenti Cerae albæ, ℥vij. ; M. Fiat unguentum. (To allay the itching attendant on some cutaneous diseases.)

℞ Sodæ Carbonatis, gr. xx. ; Aquæ Florum Sambuci, f℥viiss. ; Glycerinæ, f℥ss ; M. Fiat lotio. (For the same purposes as the above ointment, especially applicable to eruptions on the scalp.)

EPISPASTICS.

℞ Cantharidum, in crasso pulvere, ℥iv. ; Acidi Acetici Glacialis, f℥ij. ; Spiritus Vini rectificati, Oj. Digere in vase vitreo clauso per dies tres, dein exprime et cola ; Tinctura destillat calore gradûs 160° F. ad idoneam spissitudinem. (By this process a syrupy-looking extract is obtained, which, spread thinly on paper and applied to the skin, vesicates rapidly and freely.)

℞ Terebinthinæ vulgaris ; Mastiche, ana, partes sex ; Cantharidum, in pulvere, partes duas ; Euphorbiæ Pulveris, partem unam, M. (For a perpetual blister, or to act as a powerful counter-irritant.)

℞ Euphorbiæ, in pulvere subtilo, gr. xxx. ; Adipis præparati, ℥j. M. Fiat unguentum. (An excellent issue ointment, see page 231.)

℞ Olei Terebinthinæ, f℥j. ; Vitelli Ovi unius ; Tincturæ Capsici, f℥iss. ; Cetacei, ℥ss. ; Tere bene, et adde inter terendum, Olei Olivæ, f℥ij. Fiat linimentum. (An excellent rubefacient liniment.)

℞ Linimenti Ipecacuanhæ, (page 232) ; Linimenti Ammoniac, ana, partes æquales, M. Fiat linimentum. (An excellent counter-irritant applied with friction.)

EXPECTORANTS.

R Syrupi Hemidesmi, f3iv. ; Tincturæ Balsami Tolutani, f3ss. ; Tincturæ Opii Camphoratae, f3j. ; Vini Ipecacuanhæ, f3iij. ; Aquæ destillatæ, f3iij. M. Fiat syrupus expectorans, cujus sumat cochleare amplum quâque secundâ horâ. (In chronic bronchitis.)

R Vini Ipecacuanhæ, f3iij. ; Syrupi Tolutani, f3v. ; Mucilaginis Acaciæ, f3j. M. Fiat mistura, capiat cochleare parvum omni horâ vel quâque secundâ horâ. CHEYNE. (For children threatened with an attack of croup or bronchitis.)

R Antimonii et Potassæ Tartratis, gr. ij. ; Aquæ destillatæ, f3vij. ; Aquæ Lauro-cerasi, f3ij. ; Syrupi simplicis, f3vj. M. Fiat mistura, de quâ sumatur cochleare amplum bihorio. (In acute attacks of catarrh and bronchitis, combined with general antiphlogistic treatment.)

R Pulveris Senegæ, gr. xxx. ; Carbonatis Sodæ siccati, gr. vj. ; Pulveris Scillæ, gr. j. ; Sacchari puri, gr. xij. M. Divide in pulveres sex, Capiat unum quartâ quâque horâ. (In the advanced stages of whooping cough and bronchitis in children.)

R Tincturæ Lobeliæ, f3ij. ; Misturæ Amygdalæ, f3viss. ; Succii Conii, f3ij. ; Syrupi Hemidesmi, f3j. M. Fiat mistura, cujus capiat cochleare amplum tertiis horis. (An excellent mixture in asthma and in paroxysmal coughs.)

R Pilulæ Ipecacuanhæ compositæ, 3j. ; Styrcis colati, 3ss. ; Pulveris Lobeliæ, gr. xij. M. Divide in pilulas viginti quatuor, e quibus sumantur duæ sextis horis. (In old cases of bronchitis and in humoral asthma.)

NARCOTICS.

R Succii Belladonnæ, f3iv. ; Misturæ Camphoræ, f3vij. ; Syrupi Rheados, f3ss. M. Fiat Mistura, cujus capiat cochleare amplum sextis horis. (An excellent anodyne in neuralgia and tic douloureux.)

R Tincturæ foliorum Belladonnæ, f3ij. ; Linimenti Opii, f3vij. M. Fiat linimentum anodynum, sæpe utendum. (In neuralgic pains and painful glandular enlargements.)

R Unguenti Belladonnæ, 3ij. ; Camphoræ, rasæ et radactæ, 3j. ; Tincturæ Opii Camphoratae, f3j. M. Fiat unguentum. (An excellent application to painful hemorrhoids, and along the urethra in chordee.)

℞ Tincturæ Cannabis Indicæ, f℥j. ; Mucilaginis Gummi Arabici, f℥ij. ; Aquæ Cinnamomi, f℥iss. M. Fiat haustus, statim sumendus et repetatur secundis horis vel sæpius si minetur morbus. (In tetanus, or hydrophobia ; half the above quantity may be taken every five or six hours in sciatica and other neuralgic pains.)

℞ Succī Hyoseyami, f℥ss. ; Misturæ Camphoræ, f℥j. ; Syrupi Rhæados, f℥ij. M. Fiat haustus horâ somni sumendus, et repetatur alternâ horâ si non dormiat. (An excellent narcotic draught in cases where from any cause opium is inadmissible.)

℞ Olei Hyoseyami, min. xl. ad f℥ij. ; Cataplasmatīs Lini, quantum sufficit, ut cataplasma idoneæ magnitudinis fiat. (An admirable poultice in painful glandular enlargements.)

℞ Tincturæ Lactucarii, f℥j. ; Aquæ Destillatæ, f℥j. ; Aquæ Lanro-cerasi, min. xx. ; Syrupi simplicis, f℥ij. M. Fiat haustus manè et serò sumendus. (An excellent anodyne draught in plithisis.)

℞ Lupulinæ, gr. viij. ; Mucilaginis, q. s. Fiant pilulæ duæ, horâ decubitūs sumendæ. (A doubtful narcotic, used sometimes in the restlessness and watchfulness of mania and other nervous affections.)

℞ Morphiæ Sulphatis, gr. $\frac{1}{4}$. ; Extracti Glycīrrhizæ, gr. ij. M. Fiat pilula, horâ somni sumat. (For relieving pain and procuring rest.)

℞ Muriatis Morphiæ Liquoris, min. xxx. ; Aquæ florum Aurantii, f℥j. ; Syrupi Aurantii, f℥ss. M. Fiat haustus pacificus, horâ somni sumendus. (An excellent anodyne draught.)

℞ Morphiæ Sulphatis, gr. ss. ; Acidi Sulphurici diluti, min. ij. ; Aquæ destillatæ, f℥ij. ; Syrupi Limonum, f℥ss. M. Fiat solutio, duabus vicibus sumenda. (An excellent anodyne where night-watchings are troublesome.)

℞ Pilulæ Saponis compositæ, gr. xx. ; Camphoræ, rasæ et redactæ, ℥ss. ; Mucilaginis, q. s. M. Divide in pilulas xij., capiat unam quâque sextâ horâ. (In priapism and irritation of the neck of the bladder.)

℞ Liquoris Opii sedativi, min. xx. ; Syrupi Rhæados, f℥ij. ; Misturæ Camphoræ, f℥j. M. Fiat haustus. (A useful anodyne draught in febrile and inflammatory affections.)

℞ Tincturæ Stramonii, min. xv. ; Aquæ destillatæ, f℥j. ; Syrupi Limonum, f℥ss. M. Fiat haustus tertiis horis repetendus, donec dolor mitescat. (Exceedingly useful in tic douloureux, sciatica, and all forms of chronic disease attended with acute pain.)

℞ Extracti Stramonii, gr. ij.; Extracti Hyoscyami, gr. vj.; Extracti Lupuli, gr. xxx. M. Divide in pilulas duodecim, quarum capiat unam quartâ quâque horâ dolorem lenire. (In painful nervous affections, and in all forms of chronic disease attended with acute pain.)

℞ Tincturæ Toxicodendri, f℥ss.; Syrupi Papaveris, f℥j.; Syrupi Limonum, f℥ss.; Aquæ, f℥iss.; M. Fiat haustus. Capiat unum talem sextis horis. (In the acute pains which so frequently attend on chronic paralysis.)

REFRIGERANTS.

℞ Acetosellæ, ℥j.; Aquæ ferventis, f℥vij.; Infunde per horam in vase clauso, exprime et cola, dein adde, Syrupi Mori, f℥ij. Fiat mistura, de quâ sumantur cochlearia ampla duo subindè. (An agreeable refrigerant in febrile and inflammatory disorders.)

℞ Acidi Oxalici, gr. v.; Syrupi Limonum, f℥ss.; Aquæ destillatæ, f℥viiss.; M. Fiat mistura, cujus capiat cochlearia ampla duo tertiis horis. (In inflammation of the stomach.)

℞ Syrupi Acidi Citrici, f℥ss.; Aquæ destillatæ, f℥viiss.; Tere simul et inter terendo adde, Nitratis potassæ, ℥ss.; ut fiat solutio. Capiat cochleare amplum bihorio. (A useful refrigerant in hemoptysis with active inflammation.)

℞ Syrupi Aceti, f℥ij.; Aquæ destillatæ, f℥x. M. Fiat mistura, capiat cochleare amplum subinde. (To allay thirst in febrile affections.)

℞ Nitratis Potassæ, gr. xv.; Aqua destillatæ, f℥iss.; Syrupi Limonum, f℥ij. M. Fiat haustus, ter in die sumendus. (In active hemorrhages.)

℞ Sodæ Bicarbonatis, gr. xx.; Aquæ, f℥iss.; Syrupi simplicis, f℥ij. M. Fiat haustus in effervescentiâ cum succi Limonum recentis cochleari magno, subinde sumendus. (To allay thirst in febrile and inflammatory disorders.)

SEDATIVES OR CONTRA-STIMULANTS.

℞ Acidi Hydrocyanici, min. j.; Aquæ destillatæ, f℥vij.; Syrupi Simplicis, f℥j. M. Fiat haustus quâque secundâ horâ sumendus donec evanescent symptomata. (In gastric irritability, in nervous palpitations, in angina pectoris, &c.)

℞ Tincturæ Aconiti, min. v.; Misturæ Camphoræ, f℥j. M. Fiat haustus, sextis horis sumendus donec dolor mitescat. (Most useful in acute rheumatism and in neuralgia; its effects should be carefully watched.)

R Tincturæ Aconiti ; Succī Conii, ana, f3ss. M. Sit pro lotionē. (Exceedingly useful applied over the seat of the pain in tic douloureux.)

R Extracti Alcoholici Aconiti, gr. iss. ; Myristicæ adipis, gr. xvij. ; Mucilaginis, q. s. ut fiat massula. Divide in pilulas sex, quarum sumatur una sextis horis. (In chronic rheumatism and other painful affections.)

R Chloroformi, min. v. ; Tincturæ Belladonnæ, foliorum, f3ss. ; Syrupi Croci, f3j. ; Aquæ destillatæ, f3iss. M. Fiat haustus, capiat unum talem ter quaterve in die. (In epileptiform hysteria, and in hysterical neuralgia.)

R Chloroformi, min. v. ; Syrupi Rhæados, f3j. ; Aquæ destillatæ, f3iss. ; M. Fiat haustus, urgenti dolore succendendus. (A sedative draught in cancerous and spasmodic diseases.)

R Chloroformi, min. xx ; Cataplasmati Lini, q. s. Fiat Cataplasma. (An anodyne poultice for cancerous and other painful ulcerations.)

R Chloroformi, min. xx. ; Tincturæ Aconiti ; Tincturæ Opi, ana, f3j. ; Linimenti Camphoræ compositi, f3xiv. ; M. Fiat linimentum. (For neuralgic and rheumatic pains.)

R Succī Conii, f3vj. ; Syrupi Aurantii, f3x. ; Aquæ Cinnamomi, f3vj. M. Fiat mistura, cujus capiat cochleare amplum ter de die. (In chronic rheumatism, in neuralgia, and in painful spasmodic diseases.)

R Creasoti, min. ij. ; Mucilaginis Gummi Arabici, f3ij. ; Aquæ Destillatæ, f3j. ; Spiritus Myristicæ, f3ss. M. Fiat haustus quâque secundâ horâ sumendus, donec sedantur vomitiones. (In obstinate vomitings.)

R Succī Digitalis, min. xij. ; Misturæ Camphoræ, f3j. ; Syrupi Aurantii, f3ij. ; Acidi Hydrocyanici, min. j. M. Fiat haustus, bis terve in die sumendus. (An excellent remedy in nervous palpitations.)

R Spiritus Pyroxylici, min. x. ; Syrupi Aceti, f3ij. ; Aquæ, f3j. M. Fiat haustus capiat unum talem sextis horis. (A useful anodyne in the hectic of phthisis.)

R Cyanidi Potassii, gr. j. ; Aquæ destillatæ, f3ijss. ; Syrupi Limonum, f3ss. M. Divide in haustus octo, sumatur unus pro dosi. DONOVAN. (Used as a substitute for hydrocyanic acid.)

GENERAL STIMULANTS.

℞ *Ætheris Acetici*, min. xxx.; *Misturæ Camphoræ cum Magnesiâ*, f3j. M. Fiat haustus statim sumendus, et si opus sit post horam repetatur. (In hysteria.)

℞ *Ætheris Sulphurici*, f3j.; *Cetacci*, gr. ij.; Tere simul et gradatim adde *Aquæ Menthæ Piperitæ*, f3j. Fiat haustus. (In nervous headache, spasmodic colic, fainting, &c.)

℞ *Spiritus Ætherei Oleosi*, f3j.; *Misturæ Camphoræ*, f3j.; *Tincturæ Cardamomi compositæ*, f3ij. M. Fit haustus statim sumendus, et repetatur bihorio molestante flatulentiâ. (In flatulent colic.)

℞ *Spiritus Ætherei Oleosi*, f3ss.; *Tincturæ Opii*, min. x.; *Misturæ Camphoræ*, f3j. *Spiritus Anisi compositi*, f3j. M. Fiat haustus sextis horis sumendus. (A useful stimulant in the low stages of fever.)

℞ *Sesquicarbonatis Ammoniæ*, gr. v.; *Misturæ Camphoræ*, f3j.; *Infusi Arnicæ*, f3ij.; *Essentiæ Anisi*, min. xv. M. Fiat haustus, quâque secundâ horâ sumendus. (In adynamic febrile affections.)

℞ *Ammoniæ Muriatis*, gr. lx.; *Syrupi Hemidesmi*, f3ss.; *Aquæ Cinnamomi*, f3viiss. M. Fiat mistura ejus capiat cochlearia ampla duo sextis horis. (A useful mixture in adynamic fevers and in subacute laryngitis.)

℞ *Olei Cajuputi*, min. v.; *Mucilaginis Tragacanthæ*, f3j.; Tere simul et adde, *Infusi Caryophyllorum*, f3iss.; *Tincturæ Ammoniæ compositæ*, min. vj. M. Fiat haustus. (In hysterical and nervous affections.)

℞ *Spiritus Ætherei Oleosi*, f3j.; *Liquoris Muriatis Morphicæ*, min. xv.; *Aquæ Menthæ Piperitæ*, f3j. M. Fiat haustus statim sumendus, et repetatur, si opus sit, quartâ parte horæ. (A powerful stimulating antispasmodic; very useful in spasm of the stomach and in spasmodic colic.)

℞ *Tincturæ Arnicæ*, f3ss.; *Infusi Acori*, f3viiss. M. Fiat mistura, ejus capiat unciam tertiis vel quartis horis. (In nervous head-ache and in old paralytic cases.)

℞ *Calcis Chlorinatæ*, 3ij.; *Aquæ Destillatæ*, Oj.; Solve et cola, dein adde, *Mellis despumati*, 3j. Fiat gargarismus sæpè utendus, prius phiala concussa. (An exceedingly useful gargle in excessive mercurial salivation.)

℞ *Calcis Chlorinatæ Liquoris*, f3xij.; *Acidi Prussici*, f3j. Fiat lotio; Signetur, POISON. (An excellent application in chronic cutaneous diseases, when itching and tingling are very troublesome.)

R Camphoræ, rasæ et redactæ, ʒij. ; Mucilaginis Gummi Arabici, fʒj. ; Aquæ Destillatæ, fʒvij. M. Fiat mistura, de quâ sumatur cochleare amplum quartis horis. (In cases of chronic bronchitis in the old and debilitated.)

R Camphoræ rasæ et redactæ, ʒij. ; Lactis recentis, fʒvj. ; Aquæ Menthæ Pulgii, fʒij. M. Fiat mistura, ejus capiat cochleare amplum quartâ quâque horâ. (In the same cases as the above.)

R Camphoræ rasæ et redactæ, gr. xij. ; Sesquicarbonatis Ammoniac, gr. ix. ; Extracti Hyoseyami, gr. vj. ; Mucilaginis, q. s. Fiat massula et divide in pilulas sex, quarum sumatur una bihorio. (In the advanced stages of typhoid and nervous fevers.)

R Cerevisiæ Fermenti ; Misturæ Camphoræ, ana, fʒvj. ; Tincturæ Arnicæ, fʒij. M. Fiat mistura, de quâ sumantur cochlearia tria ampla tertiis horis. (An excellent stimulant in the advanced stages of fevers when nervous symptoms predominate.)

R Muriatis Ammoniac, gr. xx. ; Pulveris Aromatici, gr. vj. ; Theriacæ, q. s. ut fiat bolus. Capiat unum talem sextâ quâque horâ. (For uses, see page 330.)

R Potassii Sulphureti, gr. xl. ; Aquæ Destillatæ, fʒvj. ; Syrupi Hemidesmi, fʒij. M. Fiat mistura, ejus capiat cochleare amplum ter quaterve in die. (In rebellious cutaneous diseases.)

R Tincturæ Sabadillæ, fʒj. ; Tincturæ Camphoræ, fʒij. ; Essentiæ Rosmarini, fʒss. M. Fiat embrocatio, cum panno laneo partibus dolentis applicanda. (In neuralgia and in muscular pains.)

R Liquoris Sodæ Chlorinatæ, fʒiiss. ; Infusi Serpentariæ, fʒvj. ; Syrupi Aurantii, fʒiiss. M. Fiat mistura ; Capiat cochlearia ampla duo quartis horis. (In the advanced stages of typhoid fever.)

R Olei Terebinthinæ, fʒiiss. ; Mucilaginis Tragacanthæ, fʒss. ; Infusi Armoraciæ compositi, fʒv. M. Capiat cochleare amplum unum quâque secundâ horâ. (A useful stimulant in adynamic fevers.)

R Olei Terebinthinæ, fʒss. ; Adipis præparati, ʒiss. ; Olei Bergamotæ, min. xij. M. Fiat unguentum, mane nocteque applicandum. (In very chronic cases of eczema and herpes of the scalp.)

SPECIAL STIMULANTS.

R Arsenici Iodidi, gr. ij. ; Mammæ duræ, gr. xl. ; Mucilaginis, q. s. M. Fiat massula et divide in pilulas xx. quarum capiat unam ter de die. (In psoriasis and

lepra; the dose should be gradually increased, until one-fourth of a grain is taken three times a day.)

R Auri Iodidi, gr. j.; Pulveris Gummi Arabici, gr. xxx. Misce intimè et divide in partes æquales quindecim, è quibus sumatur una ter in die. (In secondary syphilitic affections; the dose should be gradually increased to one-tenth of a grain.)

R Auri Chloridi, gr. j.; Extracti Alcoholici Aconiti, gr. vj.; Pulveris Glycyrrhizæ, ʒij.; Syrupi, q. s. Misce intimè et divide massulam in pilulas viginti, quarum sumatur una ter in die. (In secondary syphilitic affections attended with much pain.)

R Solutionis Ammoniz Arseniatis, fʒj.; Decocti Ulmi, fʒvij. M. Fiat mistura, ejus capiat cochlearia ampla duo quater in die. (In obstinate cutaneous affections, especially lepra and psoriasis.)

R Sodii Auro-terchloridi, gr. ij.; Mannæ duræ, gr. l. Tere benè simul, et ope mucilaginis forma in pilulas viginti quatuor, è quibus sumatur una ter in die. (In syphilitic affections both primary and secondary.)

R Sodii Auro-terchloridi, gr. iv.; Solve in aquæ destillatæ, q. s; Extracti Aconiti, gr. x.; Extracti Dulcamaræ, ʒj.; Athææ radices, in pulvere, q. s. M. Divide in pilulas lxxx., quarum capiat unam ter in die; GRÖTZNER. (Said to be very efficacious in venereal skin diseases.)

R Sodii Auro-terchloridi, gr. ij.; Aquæ Destillatæ, fʒj.; Syrupi Simplicis, fʒij. M. Fiat solutio, de quâ sumantur guttæ duodecim ter in die. (One of the best forms for administering the preparations of gold, as the dose can be apportioned with great accuracy.)

R Hydrargyri Bromidi, gr. ss.; Decocti Sarsaparillæ, fʒvij. M. Fiat mistura, capiat cochlearia duo ampla sextis horis. (In secondary syphilitic affections.)

R Copaibæ, fʒij.; Solutionis Alkalinæ, (Brandish), fʒiss.; Tere benè simul in mortario vitreo, dein adde inter terendum, Olei Limonum, fʒss., et Syrupi Simplicis, fʒij. Fiat mistura, capiat cochleare minimum ter in die ex cyatho aquæ. (This is an excellent form for administering copaiva.)

R Hydrargyri Iodidi viridis, gr. ij.; Hydrargyri cum cretâ, gr. xij.; Pulveris Aromatici, gr. ix. M. Divide in pulveres sex, quorum capiat unum omni mane. (An excellent alterative in the cutaneous eruptions of infancy and childhood. The above proportions are for a child two years old.)

R Hydrargyri Iodidi rubri, gr. j; Extracti Gentianæ; Extracti Anthemidis, ana, ʒss. M. Divide in pilulas xij. Capiat unam mane nocteque. (Alterative and tonic.)

R Hydrargyri Iodidi rubri, gr. v.; Spiritus Vini Rectificati, f3j.; Tere simul, dein adde, Aquæ Destillatæ, f3j.; Iodidi Potassii, 3ij.; Syrupi Aurantii, f3ss. M. Fiat solutio, cujus sumantur min. xx., ter in die. (In secondary syphilitic affections; every twenty minims contain about a tenth of a grain of iodide of mercury and about two grains of iodide of potassium; it may be taken in decoction of dulcamara, of elm bark, or of sarsaparilla.)

R Indigo (aquæ guttis nonnullis subacta), 3ij. to 3ss.; Pulveris Aromatica, gr. xv. to gr. xxx.; Syrupi Simplicis, f3ss. to f3j. M. Fiat electuarium sumendum in die in portionibus divis. (For uses, see page 405.)

R Iodinii, gr. iv.; Ætheris Sulphurici, f3j. Solve. Capiat guttas decem ter in die. (Magendie's ethereal tincture of iodine.)

R Iodinii, gr. ij.; Iodidi Potassii, gr. xvj.; Syrupi Florum Aurantii, f3ij. M. Capiat cochleare minimum ter in die ex cyatho aquæ. (A convenient and agreeable form for administering iodine. Each fluid drachm contains an eighth of a grain of iodine and one grain of iodide of potassium.)

R Potassii Bromidi, gr. xx.; Aquæ Florum Aurantii, f3iiiss.; Syrupi Aurantii, f3ss. M. Fiat mistura, cujus capiat partem quartam sextâ quâque horâ. (In chronic enlargements of the liver and spleen, and in secondary syphilitic affections.)

R Olei Morrhuæ, f3iv.; Liquoris Potassæ Carbonatis, f3ss.; Olei Limonum, f3ij.; Aquæ Carui, f3iiiss.; Essentiæ Carui, f3ij. M. Fiat mistura cujus sumantur cochlearia ampla duo, ter in die. (In the cases in which cod-liver oil is indicated.)

R Olei Morrhuæ; Mucilaginis Tragacanthæ, ana, f3ij.; Aquæ Menthæ Piperitæ, f3iv.; tere benè simul ut fiat mistura, cujus capiat cochlearia duo ampla ter in die (This or the preceding formula may be prescribed for persons who have an insuperable disgust to the oil.)

R Olei Morrhuæ, f3ss.; Liquoris Potassæ, f3ss.; Adipis præparati, q. s. M. Fiat unguentum, sæpè utendum. (In scrofulous ulcerations, and in obstinate cutaneous diseases.)

R Tincturæ Nucis Vomicae, f3ij.; Tincturæ Cinchonæ, f3vj.; Infusi Cinchonæ, f3vij. M. Fiat mistura cujus capiat unciam ter in die. (An excellent mixture in paralysis consequent on fevers and other acute diseases.)

R Strychniæ, gr. j.; Acidi Sulphurici diluti, min. ij.; Spiritus Vini Rectificati, f3j.; Aquæ Destillatæ, f3xj. M. Fiat solutio, cujus capiat cochleare minimum ter in die. (Each fluid-drachm contains a twelfth of a grain of strychnia in the state of sulphate.)

℞ Strychniæ, gr. j. ; Aciei Acetici, min. iv. ; Spiritus Vini Rectificati, f℥j. M. Fiat solutio, cujus sumantur min. v. ter in die. (Every five minims contain a twelfth of a grain of strychnia in the state of acetate.)

℞ Strychniæ, f℥ss. ; Olei Olivæ, f℥iss. M. (Ten drops to be rubbed over the temples three or four times a day in cases of amaurosis depending on paralysis of the optic nerve.)

℞ Potassii Bromidi, ℥ss. ; Adipis præparati, ℥j. ; Brominei, min. vj. M. Fiat unguentum. (About the size of a walnut of this ointment should be rubbed over chronic glandular enlargements twice daily.)

TONICS.

℞ Acidi Phosphorici diluti, f℥ss. ; Infusi Calumbæ, f℥vij. ; Tincturæ Cardamomi compositiæ, f℥ss. M. Fiat mistura, cujus capiat unciam ter in die. (In phosphatic deposits from the urine.)

℞ Argenti Nitratis, gr. ij. ; Fellis Bovini inspissati ; Extracti Anthemidis, ana, gr. xxx. M. Divide in pilulas duodecim, quarum sumatur una mane meredieque. (In chronic affections of the stomach accompanied by much pain, but without organic disease.)

℞ Argenti Chloridi, gr. xxxvj. ; Muriatis Quinæ, gr. xvij. ; Mannæ duræ, gr. viij. M. Fiat massula opi mucilaginis, et divide in pilulas duodecim ; quarum capiat unam sextis horis. (An excellent tonic in the early stages of tubercular phthisis, and in dyspepsia occurring in debilitated habits.)

℞ Argenti Oxydi, gr. vj. ; Extracti Anthemidis, ℥j. M. Divide in pilulas xij. ; e quibus sumatur una ter in die. (In angina pectoris, epilepsy, chorea, &c.)

℞ Liquoris Potassii Iodidi compositi, f℥j. ; Liquoris Arsenicalis, f℥j. M. Fiat mistura, cujus capiat min. x. ter in die e cyatho vinario misturæ sequentis.

℞ Decocti Dulcamaræ, f℥vij. ; Syrupi Aurantii, f℥j. M. (This combination of iodine and arsenite of potash will be found very effectual in the treatment of chronic cutaneous affections of a scaly character.)

℞ Bebeerinæ Sulphatis, gr. xvj. ; Acidi Sulphurici diluti, min. x. ; Aquæ destillatæ, f℥iiss. ; Syrupi Florum Aurantii, f℥ss. ; M. Fiat mistura, cujus capiat cochlearia ampla duo, sextis horis. (In cephalalgia or neuralgic affections assuming a periodic character.)

℞ Bismuthi Subnitrat̃is, gr. l. ; Pilulæ Colocynt̃hidis compositat̃e, 3j. ; Syrupi Zingiberis, q. s. M. Fiant pilulæ xxiv. quarum capiat duas mane meridiæque. (In pyrosis with constipation.)

℞ Cetrarici Acidi, gr. xxiv. ; Extracti Calumbæ, 3ss. M. Divide in pilulas xij. quarum sumatur una quartâ quâque horâ per dies duos, febre aggreddiente. (An excellent febrifuge.)

℞ Tincturæ Chiret̃tæ, f3ss. ; Liquoris Cinchonæ, f3ij. ; Infusi Cascarillæ, f3viss. ; Syrupi Aurantii, f3vj. M. Fiat mistura, ejus capiat cochlearia ampla duo ter in die. (An excellent tonic mixture in convalescence from acute diseases.)

℞ Quinæ Muriatis, gr. xij. ; Acidi Muriatici diluti, min. v. ; Aquæ Destillatæ, f3vij. ; Syrupi Florum Aurantii, f3j. M. Fiat mistura, capiat cochlearia ampla duo ter in die. (A useful tonic mixture in chronic debility.)

℞ Quinæ *informis*, gr. ij. ; Acidi Citrici, gr. j. ; Syrupi Limonum, f3j. ; Aquæ destillatæ, f3j. M. Fiat haustus ; capiat unum talem ter in die. (In general debility and in convalescence from acute diseases.)

℞ Quinæ Arseniatis, octavem partem grani ; Aquæ destillatæ, f3iss. ; Syrupi Florum Aurantii, f3j. M. Fiat haustus : Capiat æger unum talem, quartis horis per dies duos, febre aggreddiente. (In tertian agues, when quina and arsenic separately fail to cure the disease.)

℞ Quinæ Valerianatis, gr. vij. ; Infusi Cascarillæ, f3iv. M. Fiat mistura ejus capiat semiunciam sextis horis. (An excellent remedy for hysterical and neuralgic affections occurring in debilitated habits.)

℞ Ferri Pulveris, gr. xxxvj. ; Pilulæ Aloës cum Myrrhâ, 3j. ; Olei Juniperi, min. x. M. Fiat massula ope nucilaginis, et in pilulas viginti quatuor divide : Capiat duas ter de die. (An excellent form for administering iron in chlorotic amenorrhœa.)

℞ Ferri Ammonio-tartratis, gr. xl. ; Aquæ destillatæ, f3vij. ; Syrupi Hemidesmi, f3j. M. Fiat mistura, ejus capiat cochlearia ampla duo ter in die. (A mild chalybeate tonic.)

℞ Ferri Bromidi, 3j. ; Syrupi Florum Aurantii, f3ss. ; Aquæ Florum Aurantii, f3iss. M. Fiat solutio, ejus capiat cochleare minimum sextis horis ex cyatho infusi amari. (In secondary syphilitic diseases attended with debility, in anemic affections, &c.)

℞ Ferri Carbonatis Saccharati, f3ss. ; Pulveris Myrrhæ, gr. xxiv. ; Pulveris Aro-

matici, ʒss. M. Divide in partes æquales duodecim, quarum sumatur una ter in die. (An excellent combination in the protracted diarrhœas of infancy and childhood.)

℞ Ferri Ammonio-citratis, ʒj. ; Aquæ Florum Aurantii, fʒviiss. ; Syrupi Simpli-
cis, fʒss. M. Fiat mistura cujus capiat cochleare amplum quartis horis. (An agree-
able form for administering a mild preparation of iron.)

℞ Ferri Iodidi, ʒss. ; Croci, in pulvere, ʒij. ; Sacchari puri, ʒiv. M. Fiant
Trochisci, No. 120 ; sumantur sex usque ad decem quotidie ; PIERQUIN. (An agree-
able mode of administering the iodide of iron in amenorrhœa and chlorosis.)

℞ Ferri Phosphatis, gr. xxx. ; Pulveris Myrrhæ, gr. xij. ; Sacchari puri, gr. vj. M.
Divide in pulveres sex, quorum sumatur unus mane meridieque. (In scrofulous diseases
of the bones children.)

℞ Ferri Valerianatis, gr. xij. ; Olei Sabinæ, min. vj. ; Mannæ duræ, quantum suffi-
cit ut fiant pilulæ sex, quarum capiat unam ter in die. (In chorea and other nervous
affections occurring in young girls about the age of puberty.)

℞ Salicin, gr. xvj. ; Infusi Gentianæ compositi, fʒviiss. ; Syrupi Hemidesmi, fʒss.
M. Capiat cochlearia ampla duo ter in die. (An excellent tonic in convalescence
from acute diseases of the digestive organs.)

℞ Salicin, ʒij. ; Pulveris aromatici, ʒj. M. Divide in partes æquales duodecim,
quarum capiat unam quartâ quâque hora per dies duos, febre aggrediente. (An ex-
cellent substitute for disulphate of quina.)

APPENDIX B.

POSOLOGICAL TABLE.

THE Doses in this table are those adapted for an adult, but the proportion, according to the age of the patient, may be regulated by the following rules:—The dose for an adult being 1, suppose ʒj. : under one year it will be from 1-16th to 1-12th, that is from gr. iv. to gr. v. : at two years old, 1-8th or gr. viij. : at three years old, 1-6th or gr. x. : at four years old, 1-4th or gr. xv. : at seven years old, 1-3rd or ʒj. : at fourteen years old, ½ or ʒss. : and at twenty years old 2-3rds or ʒij. : and from twenty ordinary to sixty a full dose. The above proportions as also the doses in the table are calculated according to the apothecaries' weights of the London and Edinburgh Pharmacopœias and of that of Dublin of 1826 ; as the author is of opinion that the system of weights adopted by the Dublin College, in the edition of their Pharmacopœia lately published, will never come into general use, in consequence of its great practical inconvenience.

Absinthium	ʒss. to ʒj.
Acetum	fʒij. to fʒss.
Colchici	min. xx. to fʒij.
Opii, D.	min. x. to min. xxx.
Opii, E.	min. viij. to min. xxv.
Scillæ	fʒss. to fʒiss.
Acidum Benzoicum	gr. v. to gr. xxx.
Citricum	ʒj. to ʒj.
Gallicum	gr. iij. to gr. v.
Hydrocyanicum dilutum	min. j. to min. ij.
Muriaticum dilutum	fʒss. to fʒj.
Nitricum dilutum	fʒss. to fʒj.
Nitro-muriaticum	gtt. x. to gtt. xx.
Oxalicum	gr. j. to gr. ij.
Phosphoricum dilutum	min. xx. to fʒj.
Succinicum	gr. v. to gr. viij.
Sulphuricum dilutum	min. x. to min. xxx.
Sulphuricum aromaticum	min. xx. to min. xxx.
Tannicum	gr. ss. to gr. ij.
Tartaricum	gr. x. to ʒss.
Aconiti pulvis	gr. iij. to gr. xij.
Æther Aceticus	fʒss. to fʒij.
Sulphuricus	fʒss. to fʒij.
Allium sativum	ʒss. to ʒj.
Aloë Hepatica vel Socotrina	gr. ij. to gr. xv.

Arnicae radix	gr. x. to gr. xx.
Arsenicum album	gr. 1-16th to gr. 1-8th.
Arsenici iodidum	gr. 1-10th to gr. 1-4th.
Assafœtida	gr. x. to 3ss.
Auri iodidum	gr. 1-15th to gr. 1-10th.
perchloridum	gr. 1-20th to gr. 1-15th.
peroxydum	gr. 1-10th to gr. 1-4th.
pulvis	gr. $\frac{1}{4}$ th to gr. iij.
Balsamum Peruvianum	min. xx. to min. xl.
Tolutanum	gr. x. to gr. xxx.
Barii bromidum	gr. j. to gr. v.
chloridum	gr. ij. to gr. v.
Bebeerinae sulphas	gr. j. to gr. v.
Belladonnæ folia	gr. ss. to gr. j.
radix	gr. $\frac{1}{4}$ th to gr. ss.
Bismuthum album	gr. v. to 3ss.
Borax	gr. xx. to gr. xxx.
Brominei solutio	min. iij. to min. vj.
Buchu	3j. to 3ss.
Black Drop	min. v. to min. viij.
Calamus aromaticus	gr. xx. to 3j.
Calcii bromidum	gr. iij. to gr. x.
Calomelas (Alterative)	gr. j. to gr. iij.
(Antiphlogistic)	gr. iij. to gr. v.
(Cathartic)	gr. ij. to gr. vj.
Calumba	gr. x. to 3ss.
Calx chlorinata	gr. ij. to gr. v.
Cambogia	gr. ij. to gr. v.
Camphora	gr. v. to gr. x.
Canella	gr. x. to 3ss.
Cantharis	gr. ss. to gr. ij.
Capsicum	gr. ij. to gr. viij.
Cardamine pratensis	3ij. to 3iij.
Cardamomi fructus	gr. v. to gr. xx.
Carui fructus	3j. to 3ij.
Caryophyllus aromaticus	gr. x. to 3ss.
Cascarilla	gr. x. to 3ij.
Cassia cortex	gr. x. to 3ss.
Cassia pulpa	3ss. to 3iij.
Castoreum	3j. to 3ij.
Catechu	gr. x. to 3j.
Cerevisia fermentum	f3ij. to f3iij.
Cetraric acid	gr. ij. to gr. v.
Chloroformum	min. v. to min. xxx.
Chiretta	gr. x. to gr. xx.
Cinchonæ cortex (Antiperiodic)	3j. to 3ij.
(Tonic)	gr. x. to 3ij.

Cinchonia	gr. ij. to gr. v.
Cinnamomum	gr. x. to 3ss.
Colchici cormus	gr. ij. to gr. viij.
semina	gr. ij. to gr. v.
Colocynthis	gr. ij. to gr. viij.
Confectio aromatica	gr. xx. to 3j.
Aurantii	3ij. to 3j.
Cassiae	3ij. to 3j.
Catechu compositum	3j. to 3ss.
Opii	gr. x. to 3j.
Piperis nigri	3j. to 3ij.
Rosæ	3j. to 3ij.
Scammonii	3ss. to 3j.
Sennæ	3ij. to 3ss.
Sulphuris	3ij. to 3ss.
Terebinthinæ	3ij. to 3iv.
Conii folia	gr. v. to gr. x.
fructus	gr. ij. to gr. vj.
Conserva Aurantii	3ij. to 3j.
Rosæ	3j. to 3ij.
Contrajerva	3j. to 3ij.
Copaiba	min. x. to f3j.
Coriandri fructus	3ss. to 3j.
Corrosivum sublimatum	gr. 1-12th to gr. 1-8th.
Cousso	3iv. to 3vj.
Creasotum	min. j. to min. v.
Creta præparata	gr. x. to 3ij.
Crocus sativus	gr. xij. to 3j.
Cubebæ pulvis	3j. to 3iij.
Cumini fructus	gr. x. to 3ss.
Cupri sulphas (Astringent and Tonic)	gr. ss. to gr. iij.
(Emetic)	gr. xij. to gr. xv.
Cuprum ammoniatum	gr. ss. to gr. v.
Cuspariæ cortex	gr. x. to 3ss.
Dauci fructus	gr. xx. to 3ij.
Decoctum Aloës compositum	f3ss. to f3ij.
Althææ	f3j. to f3ij.
Cetrariæ	f3j. to f3iv.
Cinchonæ	f3j. to f3ij.
Colocynthidis	f3ij. to f3ss.
Dulcamaræ	f3j. to f3ij.
Ergotæ	f3ss. to f3j.
Granati	f3ss. to f3j.
Guaiacii	f3ij. to f3iv.
Hæmatoxyli	f3j. to f3ij.
Lichenis islandici	f3j. to f3ij.
Lini compositum	f3ij. to f3iv.
Malvæ compositum	f3iv. to f3vj.

Decoctum Mezerei	f3iv. to f3v.
Myrrhæ	f3ss. to f3j.
Pareiræ	f3j. to f3iij.
Pyrolæ	f3j. to f3ij.
Quercus	f3j. to f3iv.
Sarsaparillæ	f3iv. to f3viiij.
compositum	f3iv. to f3vj.
Senegæ	f3ij. to f3iij.
Scoparii	f3j. to f3iv.
Taraxaci	f3j. to f3ij.
Tormentillæ	f3j. to f3iss.
Tussilaginis	f3iij. to f3iij.
Ulmi	f3ij. to f3vj.
Uvæ-ursi	f3j. to f3iij.
Delphinia	gr. 1-12th to gr. 1-4th.
Digitaline	gr. 1-12th to gr. 1-10th.
Digitalis (Diuretic)	gr. ss. to gr. j.
(Sedative)	gr. j. to gr. iij.
Elaterina	gr. 1-20th to gr. 1-10th.
Elaterium	gr. 1-16th to gr. 1-4th.
Electuarium aromaticum	gr. x. to gr. xl.
Catechu	3j. to 3ij.
Opii	gr. x. to 3j.
Sennæ	3ij. to 3ss.
Emetina, <i>pure</i>	gr. $\frac{1}{8}$ to gr. ss.
<i>impure</i>	gr. ss. to gr. iij.
Ergota	3j. to 3j.
Ergotin	gr. v. to gr. x.
Essentia Anisi	min. xx. to min. xl.
Carui	f3j. to f3ij.
Cinnamomi	min. xx. to min. xxx.
Feniculi	min. xx. to min. xxx.
Menthæ piperitæ	min. xx. to f3j.
pulegii	min. xx. to f3j.
viridis	min. xx. to f3j.
Myristicæ moschatæ	min. xx. to f3j.
Pimentæ	min. xxx. to f3j.
Rosmarini	min. x. to f3ss.
Zingiberis	min. xx. to min. xl.
Extractum Aconiti alcoholicum	gr. 1-6th to gr. 1-3rd.
Aloës aquosum	gr. v. to gr. xv.
Anthemidis	gr. x. to 3ss.
Belladonnæ	gr. ss. to gr. iv.
Calumbæ	gr. v. to gr. xx.
Cannabis	gr. $\frac{2}{3}$ to gr. v.
Cinchonæ	gr. v. to gr. xx.
Colchici	gr. j. to gr. iij.
aceticum	gr. j. to gr. iij.

Ferri valerianas	gr. j. to gr. iij.
Ferrum tartarizatum	gr. v. to gr. xx.
Filix-mas	3j. to 3iij.
Fœniculi fructus	3ss. to 3j.
Galbanum	gr. x. to gr. xx.
Gallæ	gr. v. to 3j.
Gentiana	gr. x. to gr. xxx.
Gigartina helminthocorton	gr. x. to 3ij.
Granatum	3ss. to 3j.
Guaiaci resina	gr. x. to 3ss.
Helleborus niger	gr. iij. to gr. xij.
Hydrargyri biceyanidum	gr. 1-12th to gr. 1-8th.
bromidum	gr. 1-16th to gr. 1-4th.
iodidum rubrum	gr. 1-16th to gr. 1-8th.
viride	gr. j. to gr. iij.
oxydum rubrum	gr. $\frac{1}{4}$ to gr. ss.
sub-bromidum	gr. j. to gr. ij.
sulphuretum cum sulphure	gr. v. to 3ss.
Hydrargyrum cum cretâ	gr. x. to 3ss.
magnesiâ	gr. x. to 3ss.
Hyoscyami folia	gr. v. to gr. x.
semina	gr. iij. to gr. viij.
Indigo	gr. v. to gr. x.
Infusum Absinthii	f3j. to f3ij.
Allii	f3ij. to f3iij.
Anthemidis	f3j. to f3ij.
Armoraciæ compositum	f3j. to f3ij.
Arniciæ	f3ij. to f3ss.
Aurantii compositum	f3j. to f3ij.
Buchu	f3j. to f3ij.
Calami aromatici	f3j. to f3ij.
Calumbæ	f3j. to f3iij.
Caryophylli	f3j. to f3ij.
Cascarillæ	f3j. to f3ij.
Catechu compositum	f3j. to f3ij.
Centaurei	f3j. to f3ij.
Chirettæ	f3j. to f3ij.
Cinchonæ	f3j. to f3iij.
Cuspariæ	f3j. to f3ij.
Digitalis (Diuretic)	f3ij. to f3ss.
(Sedative)	f3j. to f3ij.
Ergotæ	f3ss. to f3ij.
Gallæ	f3ss. to f3ij.
Gentianæ compositum	f3j. to f3ij.
Gigartinae	f3ij. to f3ss.
Granati radices	f3ss. to f3iss.

Infusum	Hemidesmi	.	.	.	f3j. to f3ij.
	Juniperi	.	.	.	f3ij. to f3iij.
	Krameriaë	.	.	.	f3j. to f3ij.
	Lauri nobilis	.	.	.	f3ss. to f3ij.
	Lini	.	.	.	f3ij. to f3iv.
	Lupuli	.	.	.	f3j. to f3ij.
	Marrubii	.	.	.	f3iij. to f3iv.
	Matico	.	.	.	f3j. to f3ij.
	Melissæ	.	.	.	f3ij. to f3iv.
	Menthaë	.	.	.	f3j. to f3ij.
	Menyanthis	.	.	.	f3j. to f3ij.
	Pareiraë	.	.	.	f3j. to f3iv.
	Polygalæ	.	.	.	f3ij. to f3iij.
	Quassiaë	.	.	.	f3j. to f3ij.
	Rhei	.	.	.	f3ss. to f3ij.
	Rutæ	.	.	.	f3j. to f3ij.
	Rosæ acidum	.	.	.	f3j. to f3ij.
	Sabinaë	.	.	.	f3ss. to f3j.
	Sassafras	.	.	.	f3j. to f3ij.
	Scoparii	.	.	.	f3j. to f3ij.
	Senegæ	.	.	.	f3ij. to f3iij.
	Sennæ compositum	.	.	.	f3ij. to f3iv.
	Serpentariaë	.	.	.	f3j. to f3ij.
	Simarubæ	.	.	.	f3j. to f3ij.
	Spigeliaë	.	.	.	f3ij. to f3iv.
	Valerianaë	.	.	.	f3j. to f3ij.
Inula	helenium	.	.	.	ðj. to 3ij.
Ipecacuanha	(Emetic)	.	.	.	gr. xij. to gr. xx.
	(Expectorant)	.	.	.	gr. ¼ to gr. ij.
Jalapa	.	.	.	.	gr. x. to gr. xxx.
Kino	.	.	.	.	gr. x. to 3ss.
Kosso	.	.	.	.	3iv. to 3vj.
Krameria	.	.	.	.	gr. x. to 3ss.
Lactucarium	.	.	.	.	gr. v. to gr. xx.
Linum catharticum	.	.	.	.	3j. to 3iss.
Liquor Ammoniaë	.	.	.	.	min. x. to min. xxx.
	acetatis	.	.	.	f3ss. to f3ij.
	sesqui-carbonatis	.	.	.	min. xxx. to min. lx
Antimonii tartarizati	.	.	.	.	min. xx. to min. xxx.
Arsenicalis	.	.	.	.	min. v. to min. x.
Arsenici et Hydrargyri hydriodatis	.	.	.	.	min. x. to min. xxx.
Barii chloridi	.	.	.	.	min. v. to min. x.
Calcii chloridi	.	.	.	.	min. xxx. to f3ij.
Calcis	.	.	.	.	f3j. to f3iv.
Chlorinii	.	.	.	.	f3ss. to f3ij.
Cinchonæ	.	.	.	.	min. xx. to f3ss.

Liquor Ferri pernitratiss	f3ss. to f3j.
Hydrargyri bichloridi	f3ss. to f3ij.
Iodinei compositus, E.	min. v. to min. xv.
Morphiæ acetatis	min. xx. to min. xl.
muriatis	min. xx. to min. xl.
Opii sedativus	min. xv. to min. xxx.
Potassæ	min. x. to min. xl.
carbonatis	min. x. to f3j.
effervescens	f3ij. to f3viii.
Potassii iodidi compositus, D. L.	f3j. to f3ss.
Sodæ carbonatis	f3ss. to f3j.
chlorinatae	min. xx. to min. xxx.
effervescens	f3vj. to f3viii.
Taraxaci	min. x. to min. xl.
Tartari emetici	min. xx. to min. xxx.
Lobelia	gr. j. to gr. v.
Lupulina	gr. vj. to gr. xij.
Magnesia (Antacid)	gr. x. to gr. xxx.
(Cathartic)	3j. to 3j.
Magnesia carbonas (Antacid)	gr. xv. to 3ss.
(Cathartic)	3j. to 3ij.
sulphas	3ij. to 3j.
Manganesia sulphas	3j. to 3vj.
Manna	3j. to 3ij.
Mannite	3ss. to 3j.
Matico	gr. x. to 3ss.
Mel Rosæ	3ij. to 3iv.
Violæ	3j. to 3ss.
Menyanthes	gr. x. to 3ss.
Mistura Althææ	f3j. to f3ij.
Ammoniaci	f3ss. to f3j.
Amygdalæ	f3j. to f3ij.
Assafoetidæ	f3ss. to f3iss.
Camphoræ	f3j. to f3ij.
cum Magnesiâ	f3ss. to f3j.
Cascarillæ composita	f3j. to f3iss.
Creasoti	f3j. to f3ij.
Cretæ	f3j. to f3ij.
Ferri aromatica	f3j. to f3ij.
composita	f3j. to f3ij.
Gentianæ composita	f3j. to f3ij.
Guaiaci	f3ss. to f3ij.
Monesiæ	f3ss. to f3ij.
Moschi	f3j. to f3ij.
Scammonii	f3ss. to f3iss.
Spiritus Vini Gallici	f3ss. to f3iss.
Monesia	gr. v. to gr. xv.

Morphia	.	.	.	.	gr. $\frac{1}{4}$ to gr. ss.
Morphiæ acetas	.	.	.	.	gr. $\frac{1}{4}$ to gr. ss.
urias	.	.	.	.	gr. $\frac{1}{4}$ to gr. ss.
sulphas	.	.	.	.	gr. $\frac{1}{4}$ to gr. ss.
Moschus	.	.	.	.	gr. x. to gr. xx.
Mucuna pruriens	.	.	.	.	3j. to 3ss.
Myristica	.	.	.	.	gr. x. to gr. xxx.
Myrrha	.	.	.	.	gr. x. to gr. xxx.
Nux-vomica	.	.	.	.	gr. v. to gr. xx.
Oleum Amygdalæ amaræ	.	.	.	.	min. $\frac{1}{4}$ to min. $\frac{1}{2}$.
Anethi	.	.	.	.	min. j. to min. v.
Anisi	.	.	.	.	min. ij. to min. viij.
Anthemidis	.	.	.	.	min. ij. to min. viij.
Cajeputi	.	.	.	.	min. v. to min. x.
Carui	.	.	.	.	min. j. to min. x.
Caryophylli	.	.	.	.	min. ij. to min. viij.
Cassiæ	.	.	.	.	min. ij. to min. v.
Cinnamomi	.	.	.	.	min. j. to min. v.
Copaibæ	.	.	.	.	min. xv. to min. xxx.
Crotonis	.	.	.	.	min. j. to min. ij.
Cubebæ	.	.	.	.	min. x. to min. xxx.
Euphorbiæ lathyris	.	.	.	.	min. iv. to min. viij.
Filicis maris	.	.	.	.	min. xx. to min. xxx.
Fœniculi	.	.	.	.	min. ij. to min. x.
Juniperi	.	.	.	.	min. ij. to min. v.
Lavandulæ	.	.	.	.	min. ij. to min. v.
Limonum	.	.	.	.	min. ij. to min. v.
Menthæ piperitæ	.	.	.	.	min. ij. to min. v.
pulegii	.	.	.	.	min. ij. to min. v.
viridis	.	.	.	.	min. ij. to min. v.
Morrhuae	.	.	.	.	f3ss. to f3j.
Myristicæ	.	.	.	.	min. j. to min. v.
Olivæ	.	.	.	.	f3j. to f3ij.
Origani	.	.	.	.	min. j. to min. ij.
Pimentæ	.	.	.	.	min. ij. to min. v.
Ricini	.	.	.	.	f3ss. to f3ij.
Rosmarini	.	.	.	.	min. ij. to min. v.
Rutæ	.	.	.	.	min. ij. to min. v.
Sabinæ	.	.	.	.	min. ij. to min. vj.
Sassafras	.	.	.	.	min. ij. to min. x.
Succini	.	.	.	.	min. v. to min. x.
Terebinthinæ (Anthelmintic)	.	.	.	.	f3ss. to f3ij.
(Cathartic)	.	.	.	.	f3ij. to f3ij.
(Diuretic)	.	.	.	.	min. x. to min. xxx.
(Stimulant)	.	.	.	.	min. x. to min. xx.
Olibanum	.	.	.	.	3ss. to 3j.

Opium	gr. ss. to gr. iv.
Opoponax	gr. xx. to gr. xl.
Oxymel	f3j. to f3j.
Colchici	f3j. to f3ij.
Scillæ (Emetic)	f3j. to f3ij.
(Expectorant)	min. x. to min. xxx.
Pareira-brava	3ss. to 3j.
Petroleum barbadense	f3vj. to f3j.
Pilulæ Aloës	gr. x. to 3ss.
compositæ	gr. v. to gr. xv.
cum myrrhâ	gr. x. to gr. xx.
et Assafoetidæ	gr. x. to gr. xv.
et Ferri	No. 1 to 3.
ante cibum	No. 1 to 2.
Asiaticæ	No. 1 to 2.
Assafoetidæ compositæ	gr. x. to 3j.
Calomelanos compositæ	gr. v. to gr. xv.
Calomelanos et Opii	No. 1 to 2.
Cambogiæ compositæ	gr. x. to gr. xx.
Colocynthis compositæ	gr. v. to gr. xv.
et Hyoscyami	No. 1 to 3.
Conii compositæ	gr. v. to gr. x.
Cupri ammoniati	No. 1 to 5.
Digitalis et Scillæ	gr. iij. to gr. v.
Ferri bromidi	No. 1 to 2.
carbonatis	No. 1 to 4.
compositæ	gr. x. to gr. xx.
iodidi	No. 1 to 3.
sulphatis	gr. v. to gr. xv.
Galbani compositæ	gr. x. to 3j.
Hydrargyri (Alterative)	gr. iij. to gr. v.
(Cathartic)	gr. xij. to gr. xx.
Iodidi	gr. v. to gr. xv.
Ipecacuanhæ compositæ	gr. v. to gr. xx.
et Opii	gr. iv. to gr. viij.
Opii sive Thebaicæ	No. 1 to 3.
Plumbi Opiatæ	gr. viij. to gr. xij.
Quinæ	No. 2 to 5.
Rhei	gr. v. to gr. xv.
compositæ	gr. v. to 3j.
et Ferri	gr. x. to gr. xv.
Sagapeni compositæ	gr. v. to gr. xx.
Saponis compositæ	gr. iij. to gr. x.
Scillæ compositæ	gr. v. to gr. xv.
Styracis compositæ	gr. iij. to gr. x.
Pimenta	3ss. to 3j.
Piper longum	gr. v. to 3j.

Piper nigrum	gr. v. to gr. xx
Piperin	gr. iij. to gr. v.
Plumbi acetas	gr. ij. to gr. viij.
iodidum	gr. iij. to gr. v.
Potassæ acetas (Cathartic)	3ij. to 3iij.
(Diuretic)	gr. x. to gr. xx.
aqua	min. x. to min. xl.
bicarbonas	min. x. to min. xx.
bisulphas	3ss. to 3iss.
bitartras (Cathartic)	3iij. to 3vj. •
(Diuretic)	gr. xx. to 3j.
carbonas	gr. v. to gr. xx.
chloras	gr. x. to gr. xx.
nitras (Diuretic)	gr. xxx. to gr. xl.
(Refrigerant)	gr. x. to 3j.
sulphas	3j. to 3iv.
cum sulphure	3ss. to 3j.
tartras	3ij. to 3x.
Potassii bromidum	gr. iij. to gr. xij.
cyanidum	gr. $\frac{1}{8}$ to gr. $\frac{1}{4}$.
iodidum	gr. iij. to gr. xv.
sulphuretum	gr. iij. to gr. x.
Pulvis Aloës compositus	gr. x. to 3j.
Aluminis compositus	gr. xij. to 3ij.
Antimonialis	gr. iij. to gr. x.
Aromaticus	gr. v. to gr. xx.
Catechu compositus	3ss. to 3ij.
Cinnamomi compositus	gr. v. to gr. xx.
Cretæ compositus	gr. x. to gr. xxx.
cum Opio	gr. xx. to gr. xl.
Ferri	gr. j. to gr. x.
Gallæ	gr. v. to 3j.
Ipecacuanhæ compositus	gr. v. to gr. xx.
Jalapæ compositus	3ss. to 3iss.
Kino compositus	gr. x. to gr. xxx.
Lobeliæ inflatæ	gr. j. to gr. v.
Rhei (Stomachic)	gr. v. to gr. x.
(Cathartic)	3j. to 3ij.
compositus	3ss. to 3j.
Salinus compositus	3ij. to 3ss.
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ERRATA.

P. xii. l. 30, for 1000th, read, 100th.

P. 37, l. 25, for *Misturi*, read, *Mistura*.

P. 73, l. 21, after, lead, insert, f5iss.

P. 265, l. 43, after, *murialis*, insert, *Liquor*, D.

DUBLIN:
WEBB AND CHAPMAN, PRINTERS,
GREAT BRUNSWICK-ST.



68056

Author Neligan, John Moore

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